American Machinist

JANUARY 2, 1935

Industry's Share in Modernization

JAMES A. MOFFETT
Federal Housing Administrator

The small home owner is doing his part. Industry is far behind in modernization and should start at once to use its depreciation reserves to replace obsolete and worn-out equipment and buildings

Harris & Ewing

ECONOMISTS and financiers often hold divergent views on important matters, but last spring they were united in a certain fixed opinion which was based on incontrovertible testimony gathered from every section of the country. They were emphatic in their statements that permanent prosperity would come to this country only when its building and heavy goods industries enjoyed a normal and lasting prosperity. Consequently, Congress, at the recommendation of President Roosevelt, passed the National Housing Act.

This measure was so drafted that a portion of it—Title I—could be made operative at once to stimulate nation-wide activity in repairs, improvements and modernization of property in order that the hundreds of thousands of idle men and women, a third of whom were on relief rolls, could again become employed in their usual occupations in the building industry and its associated industries.

The machinery for the operation of the Act being set up, the Federal Housing Administration became an active force last August. Under its direction, a better housing campaign was inaugurated. Every publicity medium was used to carry the message of what the provisions of the Act meant to the American people. However, no attempt was made to arouse the public to any semblance of patriotic fervor. The arguments used were based on motives of self-interest—the natural self-interest every man has in the welfare of his property. The appeal was made to the owner to stop the depreciation of his property, which in a majority of cases had not been repaired or improved during five years of depression. The National Housing Act provided the method by which he could secure the funds to do so. Thus the government rendered its property-owning citizens a unique service.

That the property-owners have taken advantage of this opportunity provided by the Government's National Housing Act, is shown by this record: In sixteen weeks of activity under the modernization program, up to Dec. 14, $26,544,691 worth of insured loans were reported by financial institutions. Estimates based on private and governmental surveys made throughout the country show that for every insured loaned dollar spent on modernization five cash dollars have been spent. These estimates are borne out by reports made direct to the Administration by building supply dealers, contractors and large industrial concerns dealing in building materials. Therefore, the total amount of modernization

business done through November 30, according to these surveys, and including modernization loan expenditures, has reached a total of more than $163,500,000.

In a breakdown of 44,809 insured loans reported as of November 21, in the list of properties improved by the owner, loans on single-family homes amounted to $13,181,376.41, or 69.87 per cent of $18,864,692.34; the total dollar volume of loans to owners of multiple-family homes, $3,024,021.64, or 16.03 per cent. Apartments, farm buildings and stores fell far below these figures, while there was just a "trace" of garages, factories and warehouses.

Since 1929 factory and mine owners have been putting aside nearly four billion dollars a year for depreciation of their machinery and factories, and spending very little of it. In the past five years the corporations have piled up at least ten billion dollars which, if they chose, they could begin spending tomorrow for modernization and repair.

Single-family homes are far in the lead. Single-family homes are owned by the average American, "the backbone of the country." He is not bothering about deflation, inflation, the gold content of the dollar or any such technical problems; but with confidence in his government and the future of his country, he is going ahead spending whatever it takes to modernize his property and keep it in good repair. He is making haste to realize on the advantages offered by the modernization program. He knows that the longer he delays these repairs the more they are going to cost him.

And this average American is teaching the country's corporations, great and small, a lesson in finance which, so far, they have not heeded. It is high time they did.

Contrast the action of the home owner with that of many of our large corporations. Once convinced that the modernization of his home is a good investment for himself, the home owner either draws his savings from the bank for the purpose or he borrows the money through the Modernization Credit Plan. The home owner realizes that in this action he is benefiting himself both directly and indirectly, for every dollar he spends not only improves the livability, rentability or salability of his property, but it also puts to work thousands of men heretofore on relief, whom he and other taxpayers had been assisting to support. Furthermore, he has realized that a large part of every dollar spent for modernizing goes direct to labor. Most of this money immediately goes back into the channels of retail trade, which benefits everybody. Every dollar paid in wages multiplies in the course of a year many times.

In the building trades, from sixty to seventy-five per cent of all the money spent for repairs, building and improvements goes directly to labor. This money is re-spent and turned over by those who receive it, so that approximately $4.00 worth of business is done during the year for every dollar of initial expenditure.

Our whole prosperity is based on the velocity of money—on turnover, and to the extent that we can start now doing the necessary things to preserve our property from destruction and decay, we are starting the process of turnover of private business which will take people off relief rolls, put them on private payrolls, and restore profit to business.

Some of our great corporations are planning to spend amounts running into hundreds of millions of dollars for betterments and replacements in their plants. Walter Gifford, president of the American Telephone and Telegraph declares his company will spend $200,000,000 for physical improvements. The United States Steel Corporation plans to make similar expenditures totaling $40,000,000, and the Standard Oil Company of New Jersey will spend $73,000,000 on its plant.

Industry Needs Modernization

That many of our great industries need extensive modernization, however, is indicated by what the expert economists are telling both the government in Washington and the leaders of business.

One group declares that since 1929, factory and mine owners have been putting aside nearly four billion dollars a year for depreciation of their machinery and factories, and spending very little of it. This group finds, therefore, that in the past five years the corporations have piled up at least ten billion dollars which, if they chose, they could begin spending tomorrow for modernization and repair.

Other well-informed economists say industry spent on factories and commercial buildings in the last five years five billion dollars less than was spent in the five years before that. They tell us industry should be spending right now approximately a billion a year on commercial and factory buildings alone, and should have a total of four billions invested in them by the end of the next five years.

These last tremendous figures include no allowance for what should be spent to modernize machinery and other equipment. They cover only the commercial and factory buildings.

Recently there appeared in two widely-read publications display advertisements emphasizing that business can reduce unemployment, replace wornout equipment with new, and make more profits by going in for modernization campaigns.

Industry should be spending right now approximately a billion a year on commercial and factory buildings alone, and should have a total of four billions invested in them by the end of the next five years. These last tremendous figures include no allowance for what should be spent to modernize machinery and other equipment.

The big corporations would have to make no very large expenditures, as they reckon money, to start their modernization on the proper scale. If they will modernize and others will follow suit, we shall be over the hump and enjoying prosperity 90 days from now.

And why shouldn't they do it? Every sound business consideration commands them to do it. They have no excuse for hoarding a dollar of all these hundreds of millions which they have piled up in their banks.

An article by Harwood F. Merrill in "Forbes Magazine" for November says that "altogether America's factories need *eight billion dollars in new machinery and three billion dollars in*

electrical equipment before they can boast of being truly up to the minute."

Not that the Federal Housing Administration expects the corporations to do its jobs. All we ask is that they do their share of the country's modernization job, that they do their duty by the country and by their stockholders. All we expect is that they, like the man in the street, do the obviously sensible and constructive thing: build up to efficiency their properties which are going to pieces under them.

In fact, the Housing Administration is hard at work creating business for the building and heavy goods industries. We have had the modernization campaign going for ninety days. In that time 4,200 community campaigns have been planned; 3,100 have gone into actual operation, and house-to-house canvassers have been put on in 1,061 cities and towns.

We are now generating business at the rate of between two and three millions a day. Industrialists with whom we have talked figure that by December 31, 1935, $1,500,000,000 worth of new work will have been undertaken as a result of the campaign.

Over $2,000,000 Daily

Bear in mind the enormous field in which all of us have to work, and how immense and varied are the potential markets offered to the heavy goods industries and to business generally by the modernization program. Again to quote "Forbes Magazine:"

"More than a billion dollars in paint and varnish has peeled from outside walls, has worn from inside floors . . . Three million new roofs are needed . . . and there is a market today for 10,000,000 electrical refrigerators, 8,000,000 electric ranges, and 4,000,000 washing machines."

To date we have not scratched the surface of our possibilities. For example, one bank in eastern United States has loaned three times as much modernization money as all the banks in one of our great industrial states, and another bank on the Pacific Coast has loaned twice as much.

The average American citizen is willing to spend his money to save and improve his property. He is spending it even now, two or three millions a day. But the modernization campaign which began only 16 weeks ago, will continue until December 31, 1935. It has, then, nearly thirteen months more to go.

A Service to the Machinery Industry

R. E. W. HARRISON

Director, Machinery and Agricultural Implements Division, Department of Commerce

CREATED in 1921, the Industrial Machinery Division of the Department of Commerce was consolidated with the Agricultural Implements Division in 1933 under its present title of Machinery and Agricultural Implements Division. For the purpose of classification, it is considered that industrial machinery does not include electrical machinery or equipment, nor locomotives or other railway rolling stock. Hand tools, such as hoes, rakes, etc., are not included as agricultural implements but fall within the scope of the Iron and Steel Division.

Early in its existence, the efforts of the Division were devoted largely to the promotion of export trade by means of the many specific services available to American exporters. Special attention was paid to securing foreign sales representation for American machinery makers and great stress was laid on the distribution of trade opportunities and on keeping a record of "dollars and cents results" of trade promotion work.

However, more and more consideration was gradually given to the fundamental domestic problems of the industry. Certain studies of obsolescence were conducted; industrial market analysis methods were the subject of intensive applications; and a technique of such analysis was developed that has proved sound in actual commercial use. The striking effects of business cycles on the durable goods industries were studied from various angles.

As frequently stated by Secretary of Commerce Roper, the policy of the Department of Commerce is to chart the course and to leave it to industry to navigate the ship, but examination of the situation reveals that the ship of trade in durable goods is at present in need of assistance since capital resources are reduced by 30 per cent, cash resources by 50 per cent and sales are down to 20 per cent of what is considered normal. Hence it is felt that it would be well within the purview of the Division's functions for its personnel to sit in consultation with the ship's officers in an endeavor, not only to chart the course correctly, but to bring about a state of affairs that will insure more comfortable sailing.

The direction of industry has much in common with the direction of an individual business. Before the manager of any kind of an enterprise can set up a policy it is necessary that he be in possession of certain fundamental facts in respect to the project, such as productive capacity, rate of production, his weekly, monthly or yearly wage bill and some reliable data on average and potential markets. Some of these facts we had, the most important ones, namely, rate of production and maximum production capacity we very definitely did not have. As all measures of operating efficiently must be based on these figures, the first problem was to get them.

Fortunately for our efforts in this direction, some twelve months ago the machiney builders of the United States decided to form an institution known as the Machinery and Allied Products Institute, which would draw into one organization the 50 or more trade associations engaged in looking after the varying interests of the machinery trade.

During the past twelve months this Institute has gradually passed through the organization stage and has done an outstanding piece of work as sponsor of the basic code of the industry. A somewhat similar situation exists in respect to the farm equipment industry, and as a result of overtures made by the Department, the Farm Equipment Institute has gone on record as desiring to cement and augment the facilities for the interchange of factual information which will lead to the generation of better business.

One of the first evidences of the new cooperation was the production by MAPI of charts graphically depicting the business history of each of its member organizations. These charts bear out the fact that this typical branch of the durable goods industries is still passing through the most acute phases of the depression.

Army Air Corps Depots Need Modern Equipment

Harris & Ewing

B. D. FOULOIS

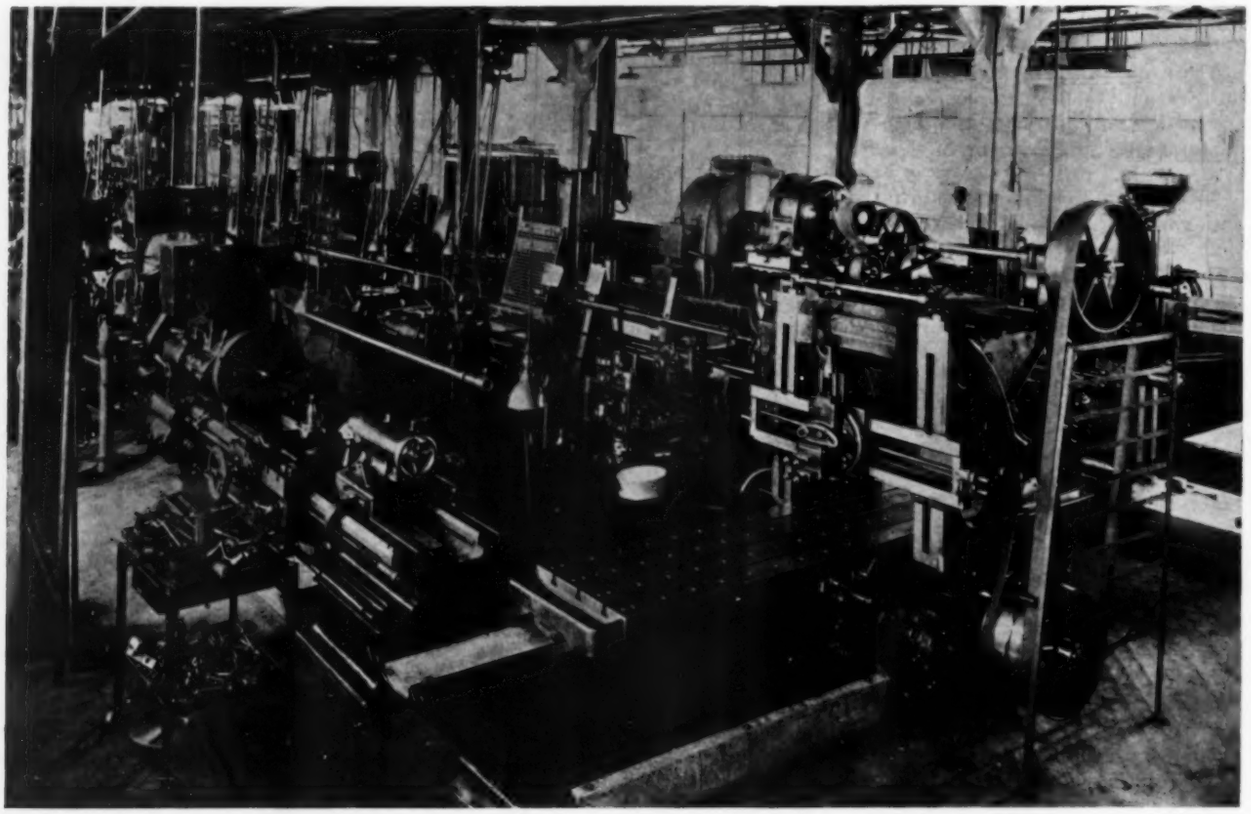
Major General, Air Corps
Chief of the Air Corps

Army planes and pilots rank with the best in the world but their performance depends on the ground equipment for maintenance and repair. Much of it is hopelessly obsolete

THIRTY-ONE years ago the Wright Brothers put together the first successfully flown heavier-than-air machine in a bicycle shop in Dayton, Ohio. Fourteen years later, during the World War, the United States started building military airplanes with slightly improved bicycle shop equipment.

When the United States entered the World War, there were neither facilities nor shops in this country for production manufacture of airplanes or airplane engines. To overcome this deficiency and to maintain the airplanes we were able to obtain, Air Intermediate Depots for supply and maintenance were established at Indianapolis, Ind.; Dallas, Texas; Rockwell Field, San Diego, Calif.; San Antonio, Texas; Little Rock, Ark.; Middletown, Pa.; Fairfield, Ohio; Scott Field, Ill.; Arcadia, Florida, and Montgomery, Ala. It was impossible to foresee at that time the type of equipment which would be necessary properly to maintain and repair airplanes. Furthermore, it was necessary to install practically all woodworking machinery, since airplanes at that time were completely fabricated out of wood.

Following the close of the War, this depot system was continued with little change, although during the process of demobilization some of the depots were abandoned. The present depot system of the Army Air Corps was established



In its day the equipment illustrated was as good as any but that day is past. Modern airplane motors are built to limits of accuracy that demand the very best of maintenance equipment

in 1926. At that time branch depots for overhauling and repairing airplanes and engines were located at Middletown, Pa.; Fairfield, Ohio; Scott Field, Ill.; San Antonio, Texas, and Rockwell Field, Calif.

The nucleus for the San Antonio Air Depot was established at Kelly Field, Texas, during the World War, the various activities being housed in buildings of war-time construction. With the limited facilities which these activities afforded, they were nevertheless utilized both for the supply and repair of airplanes for the air fields operating in the vicinity of San Antonio.

Most of the buildings housing the activities of this depot were located in the area then known as "Kelly Field No. 1." In 1925, this field was renamed "Duncan Field," in memory of the late Major Thomas Duncan, of the Air Service, who was closely associated with Kelly Field No. 1 in its earliest days. Shortly thereafter, plans were drawn up to rebuild this depot into a modern repair plant. The construction work was completed in 1932. San Antonio Air Depot now takes care of the supply, overhaul and repair for all Air Corps stations east of the Rocky Mountains, south of the Missouri River, and West of the Mississippi River. The major portion of the Air Corps work performed in this area is for the Air Corps Training Center in and around San Antonio.

The Rockwell Air Depot, built on North Island, San Diego, Calif., during the World War, is still operating in the old war-time buildings and with war-time equipment installed therein at that time. This depot performs the necessary repair and overhaul work on airplanes for Air Corps activities on the entire West Coast. Its equipment is obsolete and the buildings in which it is housed are worn out. It is hoped that in the near future a more modern depot will be built to ameliorate this condition, and that new equipment will be provided so as to make it a modern plant.

The Fairfield Air Depot at Fairfield, Ohio, takes care of the needs of all Air Corps stations in general between the Mississippi River and the Allegheny Mountains. This depot was built during the World War, and it is now in the process of reconstruction.

The Middletown Air Depot, located at Middletown, Pa., was constructed during the World War and enlarged subsequent thereto by the addition of several ordnance buildings which were located in its immediate vicinity. At the present time this depot is undergoing reconstruction. Some of its equipment is twenty or more years old and requires almost one hundred per cent replacement. The function of this depot is to provide for the needs of all Air Corps units stationed on our eastern seaboard.

The Scott Field Air Depot was established during the World War, and it functioned as a supply and repair activity for heavier-than-air craft. In 1922, it was decided to concentrate at Scott Field all lighter-than-air training, repair and overhaul work, and this depot is now used exclusively for the repair and overhaul of Air Corps lighter-than-air equipment. In an emergency, however, it can also be used for the repair and maintenance of heavier-than-air equipment. This depot is still utilizing buildings of war-time construction, and its equipment is still that which was purchased during the World War.

At these depots, all the flying equipment of the Air Corps is overhauled and maintained and, in addition, they store and issue the necessary supplies and equipment for operating all the

While this shop photograph was evidently taken in the days when Liberty engines were still in service it shows conditions of today because the same tools are still in use

aircraft of the Air Corps. Although in the original plans for these depots it was contemplated that they would be modern and efficient plants, the requirements incident to national economy necessitated the curtailment of these plans to a considerable extent, particularly in connection with machine equipment, with the result that a considerable portion of the machinery and machine tools now in use is still that which was purchased during the World War era. It is natural to assume, therefore, that, because of this lack of modern equipment, the efficiency of these depots along the line of production and overhaul is not up to the standard possible of attainment.

In addition to the repair, maintenance and overhaul work performed by the various air depots above enumerated, each of the Air Corps stations throughout this country, of which there are about thirty-four, operates a certain amount of machine equipment in order to meet the requirements of local maintenance. This station equipment was acquired from time to time, as the urgency of the situation required. In the hectic days of the War, when all energies were directed toward the production of airplanes and the training of young men to pilot them, it was difficult to devote the required amount of attention to repair and maintenance items. In the years following the war, the necessity for providing a considerable amount of modern machinery at all these stations became apparent purely from a training point of view. Under field conditions, it will be necessary for the Air Corps to perform a considerable amount of local repair work in the field and, in order to meet this situation, it will be necessary to establish advance depots, manned to a large extent by military personnel. Unless these key men receive training during times of peace at their permanent stations, there will be none available in an emergency.

How a modern Air Corps station looks from the air. This is the cadet area at Randolph Field in Texas

During the past several years many of our large Air Corps stations and depots have been rebuilt and provided with modern up-to-date buildings. During this same time the trend of aircraft development has definitely departed from the wood and fabric method of construction and has been replaced by that involving lighter and more durable metallic structures. The advent of these light alloy metals makes it imperative that the bulk of the machinery to be placed in these buildings be suited to the fabrication requirements imposed by this trend. As a large part of the machinery now available for repair and maintenance cannot be used at all, this results in a tremendous amount of hand work and high manufacturing cost.

As General Foulois points out in the accompanying article lack of adequate modern machine tools leads to much expensive hand work that would otherwise be unnecessary in Air Corps shops

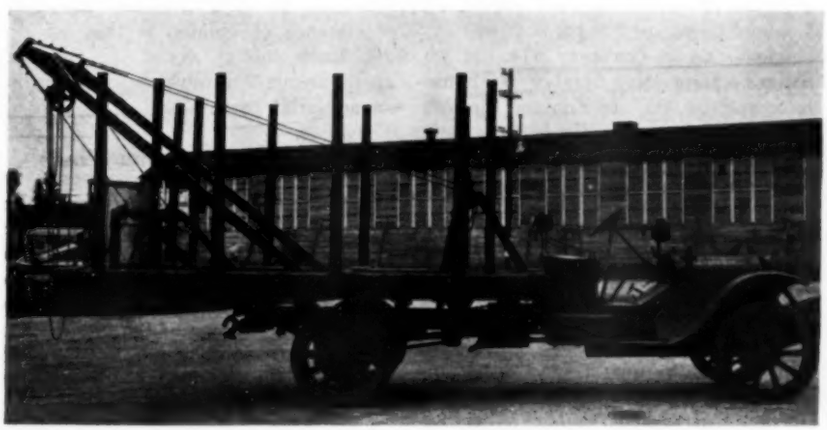
In addition to the machine equipment for manufacturing purposes, there is an urgent requirement at Air Corps stations and depots for what is known as hangar and airdrome equipment. These items range from five-ton tractors down to hand-operated servicing equipment. Airplanes now being furnished the Air Corps require a great deal more care in their handling and servicing than was the case heretofore. This is due to the increase in their size, weight and speed. Where heretofore holes or ruts in the airdrome were not considered dangerous, these are now a menace and, in consequence, the fields must be carefully leveled, the grass and weeds cut, ground handling equipment for airplanes and cargoes must be provided, etc. In this connection, it should be borne in mind that Air Corps units will be required to operate a large percentage of their time in the field. Highly mobile items of equipment for servicing and maintenance away from home stations must be provided. The bulk of this equipment must lend itself to transportation by air and, in consequence, will have to be especially designed and provided during peace time. After an emergency arises it will be too late.

An excellent example of the necessity for having the Air Corps fully equipped and ready for any emergency was thoroughly demonstrated during the recent responsibility placed upon the Air Corps for carrying the air mail. Within six days' time it was necessary to completely remodel military aircraft required for this purpose from its normal set up to that required for carrying mail. In order to accomplish this change, it was necessary to fly the airplanes to the various air depots, inasmuch as the individual stations did not possess the machine equipment essential for the purpose. When these airplanes arrived at the depots, the lack of modern machinery capable of handling metals of all kinds efficiently imposed a task upon the mechanics the magnitude of which will never be appreciated by the public. Within the space of one week, approximately two hundred airplanes were passed through the depots, stripped of their fighting equipment, remodeled into transport airplanes, and turned out to the operating personnel for use on the date specified for the beginning of operations.

It is difficult for the average citizen to realize that the critical factor in operating an efficient air force is the efficiency of the ground maintenance. Airplanes and pilots are of the very best, but to keep them in the air it is absolutely essential that adequate mechanical means for so doing be provided. Supplying Air Corps depots and fields with modern machinery will not only result in much greater efficiency, but, since this new equipment tends to cut down production costs, the interests of economy will be served as well.

Our Air Corps stations and depots are not provided with this machinery. Our Air Corps cannot function in the manner in which it should operate unless it possesses this necessary equipment. To modernize and fulfill this need for new equipment, the Air Corps, through the Secretary of War, is applying to the Public Works Administrator for an allotment of approximately three million dollars. If received, this money will be expended throughout the Air Corps to equip and modernize machinery installations and flying field equipment.

The expenditure of these funds will redound to the advantage not only of the nation as a whole in aiding to no small extent in placing the aviation component of its national defense on a more efficient footing, but will prove beneficial in other respects. The ground personnel, with better tools to work with, will be more nearly satisfied with the products of their toil, while the pilot, with the knowledge that his airplane and equipment receive the care they deserve, will gain more confidence and his morale will be heightened. Industrial concerns manufacturing this machinery will be provided with more business, and employment will be available to those in dire need of it in the various localities in this country and in Insular possessions.



Although more or less of a home-made job this old White truck with its simple crane is the best available equipment at some stations

What is needed to handle modern flying equipment is the well designed six-wheel truck at the right. A number of these trucks are in the program

Social Security Legislation

K. H. CONDIT
Editor, American Machinist

A brief outline of some of the reforms that are sure to be presented in the new Congress and an attempt to forecast the action likely to be taken

OPINIONS are as far apart as the poles on the merits of the various forms of social security legislation issue to be presented and adopted as Congress meets today, but there is no doubt whatever that some form of social legislation will be on the books when Congress adjourns. Since legislation of this sort affects every citizen in some way an effort will be made in what follows to explain the significance of such proposals as unemployment insurance, old age pensions, protections for widows and children, and health insurance. A word as to the prospects of each will also be ventured.

In his famous address to the social security conference in Washington some weeks ago President Roosevelt apparently placed unemployment insurance first on the legislative program. At any rate his speech was so interpreted in the press and the press interpretation has been generally accepted by industry. Examination of the business platforms offered by various groups is sufficient proof of this statement.

A Major Calamity

What experience with unemployment insurance is there to base new plans on and how many people would be affected by such plans? In 1930 some forty-nine million people were gainfully employed in the United States. This figure excludes children under 10 and housewives. Two years later, according to various estimates, some 25 per cent of these people had lost their jobs. One out of every twelve families was on relief and by 1933 the government was spending more than a billion dollars a year to help them. Certainly the magnitude of this calamity is sufficient to warrant the most serious efforts to find a remedy.

In this country we have had little experience with unemployment insurance or unemployment reserves. In seventeen other countries, however, some forty-three million persons are under some sort of unemployment scheme. This number compares with sixty-three million for whom sickness benefits are provided and sixty-nine million eligible for old age pensions. In all of these instances it should be remarked that agricultural workers and domestic servants are excepted.

Organization Needed

How much of an organization is required to administer such schemes and what is the administrative cost? In England there are 500 employment exchanges and in Germany 374. If we had a corresponding number we should have about 1,000. In England the cost of administering the funds is a little over 6 per cent of the total expenditure, and in Germany a little under 7 per cent. It has been estimated that if the English plan were adopted in the United States the expenditure per year would be approximately a billion three hundred million.

Generally speaking, when an unemployment insurance scheme is administered by industry itself, the fund accumulated is known as an unemployment reserve. This definition implies that the benefits will stop when the fund has been exhausted. The scheme is called an insurance scheme if it is administered by a state body, and such a scheme contemplates that benefits will continue throughout the duration of unemployment. So far, however, no legislation has been proposed without some definite limits. Under the insurance arrangements the funds are put into a common pool for distribution to all of the unemployed.

Experience indicates that there will never be enough funds in the pool to carry the country through a depression as severe as the one we have just undergone, and that supplementary funds will have to be allocated or contributed by the government. This was the case in England where the fund was exhausted rather shortly and had to be supplemented by the dole. It is only recently that steps have been taken to support the two activities and to get the unemployment insurance fund back on an actuarial basis if that sort of basis can be said to exist. At any rate the fund has been accumulating in England since March, 1933. As a practical matter about the only insurance feature of the program lies in the pooling of funds. As for the actuarial character of such schemes the preponderance of opinion is that we do not know enough about the risks of unemployment to develop anything on an actuarial basis.

British and German Plans

A word about the details of the British and German plans will give some idea of what we may be up against over here. Great Britain's scheme dates from 1911, when it was started in a few trades, and it was greatly extended by the unemployment insurance act of 1920. This act has been subject to frequent amendment since. Insurance is compulsory for all those between the ages of 16 and 65 and covers nearly thirteen million persons. The Ministry of Labor conducts the scheme through a system of employment exchanges, and contributions are made by employers, employees and the state. There is a waiting period of six days and the benefits are payable for 26 weeks in any twelve months. To be eligible for these benefits the applicant must have made thirty contributions within the two years preceding the date of claim, and he must be unemployed, capable of and available for work. For those who cannot meet these requirements there is a system of transitional payments which are made subject to a test of need and for which

the funds are supplied by the government.

Germany started an unemployment insurance plan in 1927 and this plan has been amended many times since. It is compulsory and covers wage earners from the school-leaving age to 65. The compulsory limit for employees is 8,400 Reichsmarks a year, but those earning more than that may insure voluntarily. Approximately twelve and a half million persons are covered. The scheme is administered by the Federal Institution for Employment Exchanges and Unemployment Insurance. Employers and employees contribute equal amounts except that those who apply for voluntary insurance pay the whole contribution. The rates were originally 3 per cent of the general wage rate but have since been increased to 6½ per cent. The income and expenditure of the scheme are so adjusted that no deficiencies ensue. To be eligible for benefits a person must prove that he has been in insurable employment for at least 52 weeks during the preceding two years. The scheme differs from the English plan which pays the same benefit regardless of wage rate in that it pays a definite percentage of the earnings of the applicant. For this purpose earnings are divided into eleven wage classes. The benefit may run for twenty weeks after a waiting period of 21, 14 or 7 days depending on the wage class of the insured person.

An emergency relief benefit scheme is coordinated with the insurance scheme to take care of cases that run beyond the limits of the insurance plan. Practically every European country has found it necessary to make provision beyond the limited period to relieve the hardships which long continued unemployment entails.

Wisconsin Leads

In this country only one state has passed an unemployment insurance law, the State of Wisconsin, but bills have been introduced into several other state legislatures. The Wisconsin plan has been operating since last summer and has gained the support of some employers. All employees of employers with ten or more persons are covered but those receiving more than $1,500 annually, or who have been residents of the state less than two years, or have had less than forty weeks employment in the state in the preceding two years, are excluded. Farm labor, domestic help, those on the public pay roll or in interstate railway transportation, and those on relief, are excluded. Contributions are made by employers only to the amount of 2 per cent of the pay roll during the first two years and after that when the reserve per employee drops below $55. When the reserve is between $55 and $75 the contribution is 1 per cent and it stops when the reserve reaches $75. By definition the pay roll excludes all persons earning less than $300 per month. These contributions may not be deducted from wages. They are paid into the unemployment reserve fund which is administered by the industrial commission. Separate accounts are kept for each employer and his reserves are devoted exclusively to the payment of benefits to his own employees. The employer pays two-tenths of one per cent of his pay roll for the cost of administration, on top of his other payments. The waiting period is two weeks and the benefit ceases automatically if the beneficiary refuses to accept suitable employment. The amount of benefit is 50 per cent of the average weekly wage or $10, whichever is lower.

The Ohio Proposal

The other state plan which has received considerable attention but which has not become law is the Ohio unemployment insurance scheme. This scheme reaches down to employers of as few as three workers. It is contributory, employers pay 2 per cent on their pay rolls and employees 1 per cent of their wages. In this instance the pay roll is defined as including employees eligible to receive benefit and is therefore quite different from the Wisconsin definition. Payments are made to an unemployment insurance fund under the custody of the state treasurer. To be eligible an applicant must have paid premiums for not less than 26 weeks in the year preceding his unemployment or for not less than 40 weeks in the preceding two years. The other principal difference from the Wisconsin plan is that the maximum benefit is $15 per week instead of $10. The maximum duration of benefit is 16 weeks in any consecutive twelve months.

The American Association for Labor Legislation has proposed a plan more liberal than the Wisconsin plan. Several other plans of unemployment insurance, including the Deane plan which has been given considerable attention in Washington, have been proposed, but space does not permit of their elaboration. At the moment the prospects are that so many different schemes will be advocated before Congress that nothing but confusion will result during this session. The advocates of the various plans are so far apart that it seems unlikely that they can unite on anything that could be enacted into law.

Turning now to old age pensions we find that both here and abroad there has been some experimentation and consequently there is more experience on which to base legislation. Many of the larger industrial companies have entirely successful pension plans, some of which have existed for many years. Others, unfortunately, have not been built up on an actuarial basis and have succumbed to the distresses of the depression.

Old Age First

There are very good reasons to believe that an old age pension law stands a much better chance in this Congress than any proposal for unemployment insurance. Among these reasons is the fact that with the continued improvement in preventive medicine which has extended the life span of the people, and with the practical elimination of immigration which used to bring into the country at least a million persons between the ages of 20 and 30 each year, the average age of the population is rising steadily. The problem of caring for the old is therefore becoming steadily more acute.

Adding to this fact the unavoidable nature of advancing age and the consequent popular support for an old age pension plan, and you have an appeal to the politicians which is far more tangible than the somewhat intellectual appeal of unemployment insurance.

Legislation for the protection of widows and children and for the establishment of health insurance plans has been given careful consideration and will certainly be proposed. Here again we have more experience on which to base sound laws and it may be that bills providing for such reforms will be passed.

There can be no question concerning the real necessity of reforms of this nature. The question that does arise is whether we have sufficient information to enable us to frame workable laws. Whether or not bills are introduced and passed the recommendation of the employers that continued study be given to this whole subject is entirely sound. We have only to look at the number of times the English and German laws have been amended to grasp the significance of the recommendation.

Motor Selection for Turret Lathes—I

J. R. LONGSTREET
Warner & Swasey Company

To be efficient in operation, machine tools must be correctly motorized. The author gives a method for analyzing the many factors that need be considered

TODAY the majority of turret lathes are factory equipped by the manufacturer with individual motor drives. The greatest factor influencing this trend is the machine user. It is desirable that those most concerned with the turret lathe as a production unit should become familiar with the various mechanical factors influencing the choice of motor size for a given machine or for a specialized application.

To the purchaser of the machine, economy of operation is a paramount factor; to the manufacturer of the machine, flexibility to meet varying demands is the predominant factor. The following article is presented to show a way of satisfying the two extremes outlined above by graphic an-

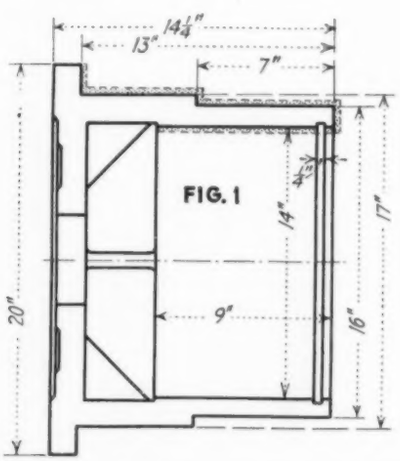


Fig. 1 — Calculations are based partly on machining this foot housing, as a typical cast iron job

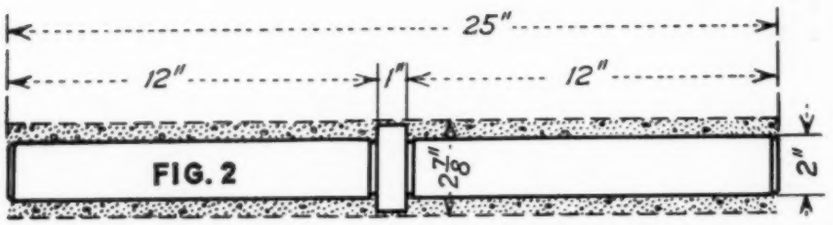


Fig. 2—Another basis for figuring the required horsepower is an SAE 1035 steel shaft cut from 3-in. bar stock

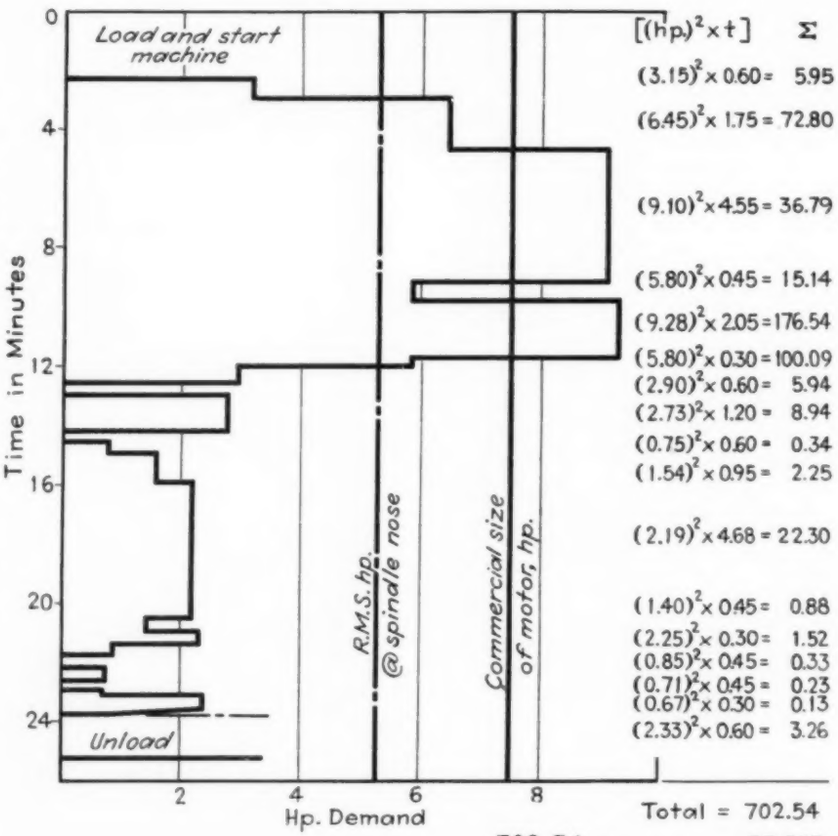


FIG. 5

Fig. 5—Computations for the motor required in machining part No. 1709 with stellite

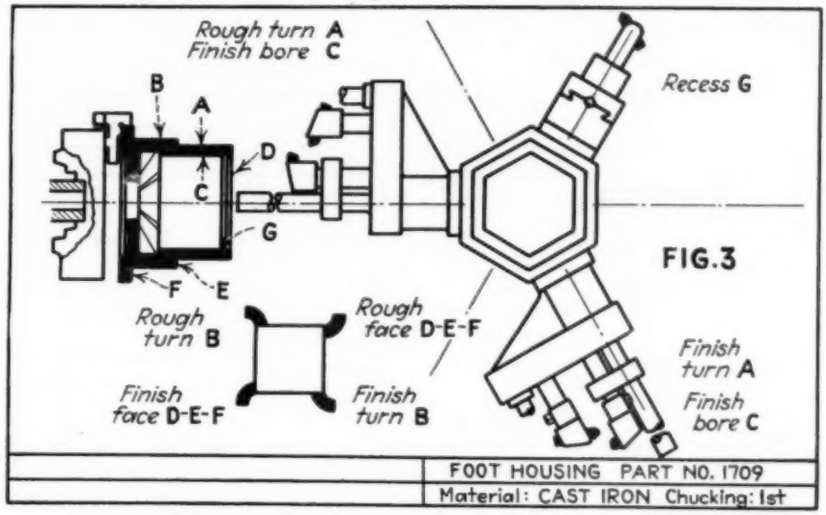
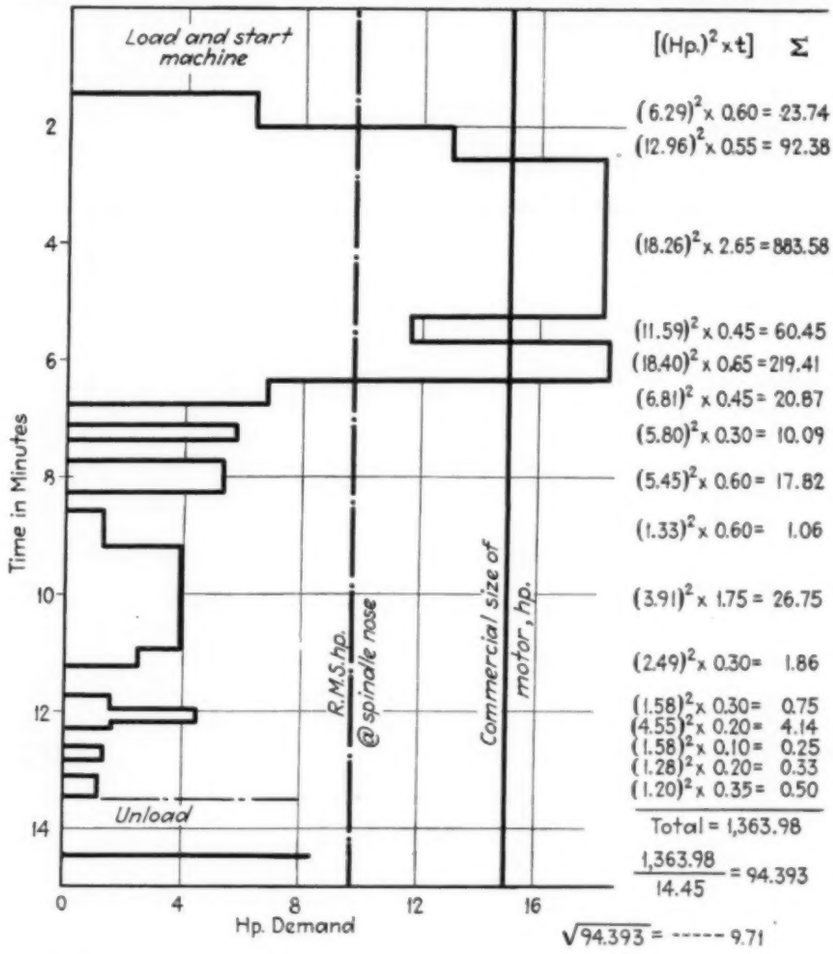


FIG.3



Eff. @ 75 per cent .. $\frac{9.71}{0.75}$ = 12.95 motor selected = 15 hp.

$T_M = \frac{18.4 \times 33{,}000}{2 \times 3.1416 \times 38} = 2{,}543$ ft. lb. $\frac{2{,}543 \times 38}{1{,}750 \times 0.75} = 73.63$ ft. lb. @ motor

Max. torque demand = --------- 73.63 ft. lb.

* Max. torque available for 15 hp. motor selected = 91 ft. lb.
Ratio = 81 per cent ∴ 15 hp. motor is correct

FIG.6

Fig. 3—Above is shown the tooling arrangement assumed for computing power consumption on the cast-iron housing. Fig. 6—Computations for the motor required in machining this part with cemented carbide

alysis of concrete problems. While the factors discussed are particularly turret lathe problems, as they are affected by production demands, tooling methods and materials handled, the method is applicable to the general field of machine tools involving intermittent variable load conditions.

In presenting this article we are indebted to the General Electric Company at Schenectady for data furnished and for the constructive suggestions of its engineers on the subject matter.

The subject is treated in three phases. First is a graphic illustration of the variable power demand for particular turret lathe installations; two different workpieces are considered, each piece having two sets of cutting conditions. Second is the method of determining the horsepower requirements by formulas for the above conditions. Third is the motor power computations and selection for the given problems.

For purposes of this article workpieces and tooling methods were selected involving the use of a standard 3-A universal hollow hexagon turret lathe. This machine has a swing capacity of 24¼ in. and a bar capacity of 4½x46 in. long. The specific factors influencing the selection of this turret lathe are first, the 20½ in. maximum diameter of the workpiece of cast iron, shown in Fig. 1, and second the power demand of the steel workpiece, shown in Fig. 2, when using cemented carbide cutters in the tooling set-up. In Figs. 1 and 2 the shaded areas represent the metal to be removed.

The set-up of tooling used for producing the foot housing casting is shown in Fig. 3. Two types of cutters are considered for this set-up, allowing different rates of metal removal. The first set is of cutters of stellite, or equivalent metal, the second set is of cemented carbide.

Fig. 4 shows the set-up of tooling for producing the steel shaft. Two sets of cutters are again considered. The first is all high-speed steel, the second a combination of high-speed steel and cemented carbide.

Figs. 5 to 8 inclusive show graphs of the power requirements for the groups of tooling in the above named order.

*In Fig. 6 the 15-hp. motor selected is of a different type than used in Fig. 5. This motor has a lower proportional maximum torque than the one used for Fig. 5 and was purposely selected for economic reasons. The maximum torque of a 15-hp. motor of the same type as selected for Fig. 5 is 115 ft.-lb.

Typical Load Characteristics

Before dealing with their construction we wish to point out several facts which these charts illustrate clearly. Note that no power losses of machine and drive are included in the graph, but these losses are considered in the final selection of the motor. The graph shows instantaneous power demand at the spindle nose. The charts individually show a heavy fluctuation in power demand, shifting from roughing to finishing cuts, because of the practice of removing all possible metal in the roughing operation. The variability of power demand is also clearly indicated as the various multiple and combined cuts take effect.

A comparison of the charts for the same workpiece shows the horsepower demand to be proportional to the rate of metal removal, other factors remaining a constant. In Figs. 5 and 6 the material, cast iron, amount of metal to be removed, set-up of tooling and rate of feed remain constant. The cutting medium only has changed, allowing of higher surface speed of cutting. The same is substantially true of charts shown in Figs. 7 and 8. Note that the peak power demand, when using cemented carbide, caused by the increase in cutting speed, is doubled or more than doubled.

The prime requisite to the success of any cemented carbide tool application is the ability to deliver the necessary power to the spindle nose and absorb the power by means of a properly mounted tool on a sufficiently rigid machine. The rigid design of the modern turret lathe equipped with anti-friction precision bearings, and hardened and ground transmission gearing, permits of handling the necessary increase in power through an increase in the speed of the drive pulley of the machine. Much higher percentages of speed increase are allowable to this type of machine tool than one with plain bearings, using lower grades of material in gears and clutches. As a matter of caution no application of cemented carbide should be made without a check of the power requirements of the particular set-up, to make certain that motor, transmission and machine are suited to the job.

In the production of a part there are periods of no demand at the spindle nose. These occur during periods of loading and chucking, and during turret station indexing periods. In the calculation of the size of motor these periods of no demand must be dealt with, because during them, the motor has an opportunity to cool.

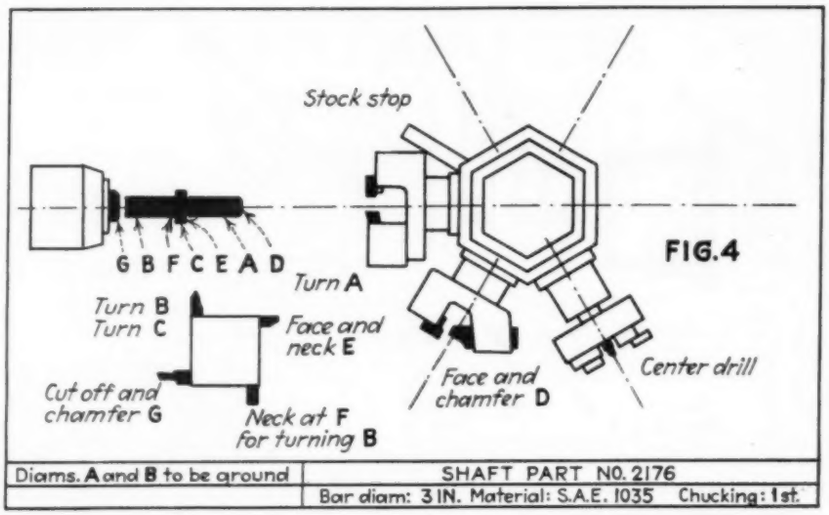

Stock stop
G B F C E A D
Turn A
Turn B
Turn C
Face and neck E
Cut off and chamfer G
Neck at F for turning B
Face and chamfer D
Center drill
Diams. A and B to be ground
SHAFT PART NO. 2176
Bar diam: 3 IN. Material: S.A.E. 1035 Chucking: 1st.

FIG. 4

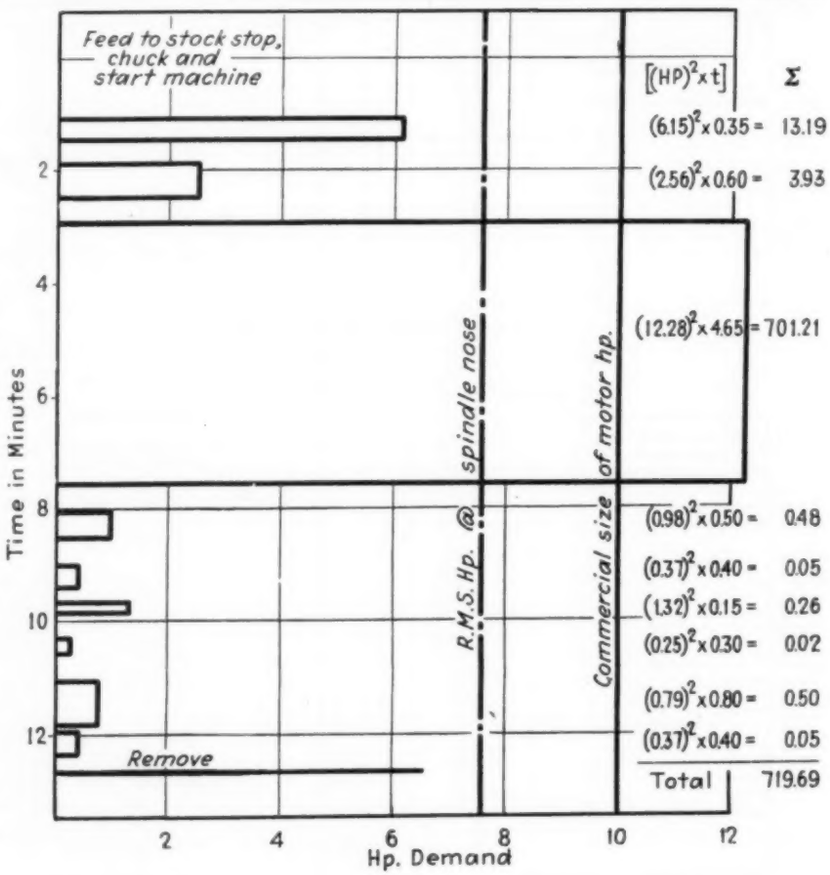


FIG. 7

$\frac{719.69}{12.65} = 56.89$

$\sqrt{56.89} = 7.54$ hp.

Eff. @ 75% $\therefore \frac{7.54}{0.75} = 10.05$ Motor selected = 10 hp.

$T_M = \frac{12.28 \times 33{,}000}{2 \times 3.1416 \times 83} = 777$ $\frac{777 \times 83}{1{,}150 \times 0.75} = 74.78$ ft. lb. @ motor

Max. torq. demand = ———— 74.78 ft. lb.

" " available for 10 hp. motor selected = 91 ft. lb.

Ratio = 82% $\therefore$ 10 hp. motor is correct

Fig. 4—Above is the tool set-up used on the steel shaft. Fig. 7—Computations for the motor required in machining this part with high-speed steel cutters

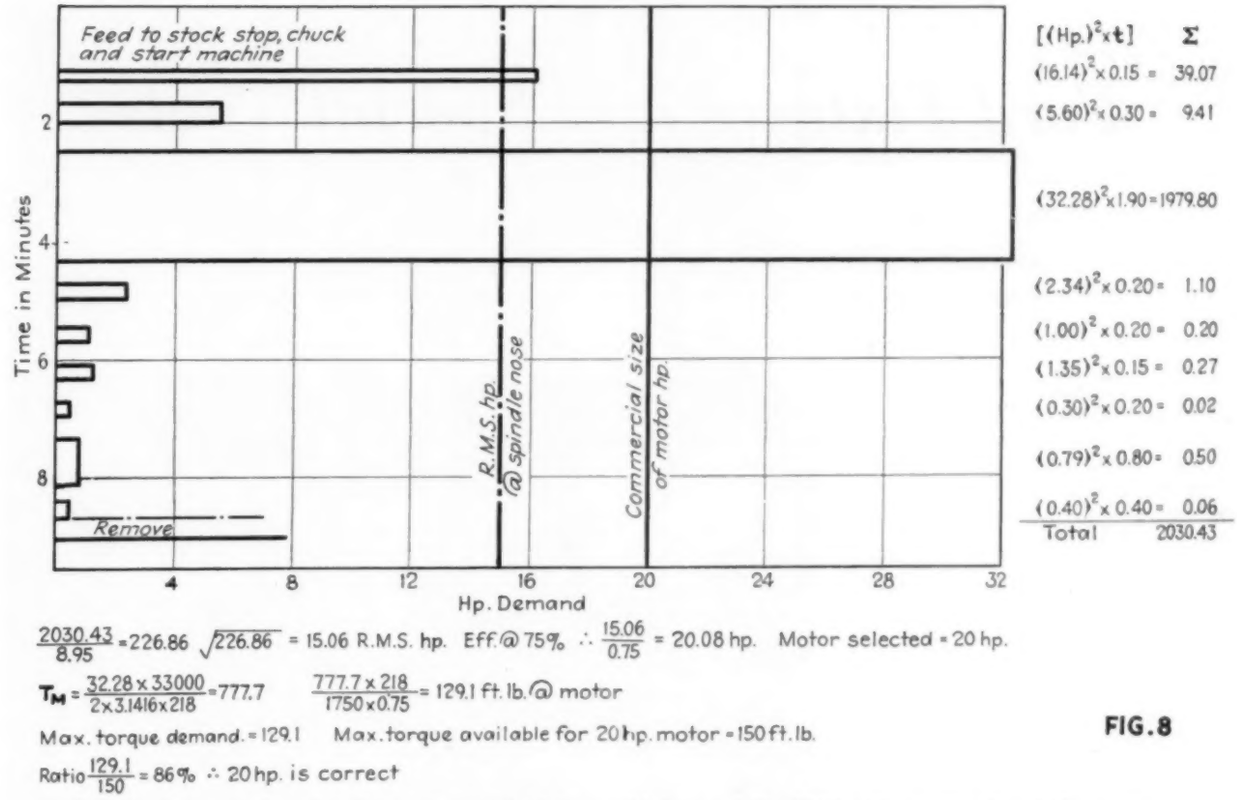


Fig. 8—Computations for the motor required in machining part No. 2176 with cemented carbide cutters.

Another factor entering this same picture of temperature of the motor is the down time of the machine while sharpening and changing cutters, obtaining raw material, etc. Only flat time, or what is known as floor to floor time, has been considered in our calculations, because the down time occurs at such irregular intervals. Neglecting to consider this down time simply adds an additional factor of safety in the calculations that follow.

The electric motor is designed for efficient operation at or near its rated capacity. A glance at the charts shows the impossibility of peak efficiency operation for such variable demands. The size of motor must be of necessity a compromise that has to deal with an overloaded condition for part of the cycle and underloaded the remainder of the cycle.

Aside from the power angle of the discussion, two points should be explained. In Figs. 5 and 6 different time values are assigned for loading and unloading. This is because a hand chucking method is contemplated with the stellite set-up, while the chucking for the cemented carbide set-up contemplates power chucks and fast acting hoist. The second point is that, in any tooling problem, other factors remaining constant, doubling the speed of cutting does not reduce the floor to floor time of the cycle proportionately. The handling time for the machine and the workpiece for a given method remain the same, regardless of cutting speed.

Rules for Motor Selection

Electric motors for commercial use generally allow for a certain factor of continuous overload operation. For intermittent duty the percentage of overloading can be increased. In any motor application for intermittent duty, the measure of the overloading possible is limited by two facts: (1) the allowable temperature rise of the motor must not be exceeded; (2) the maximum torque of the motor must be sufficient to meet the peak load. Therefore, in any motor application, we must know the measure of heat caused by the intermittent load, and we must calculate the peak load. Heat being energy, its measure is expressed as *the sum of the squares of the individual loads in horsepower multiplied by the time interval of application of the individual load.* This is expressed by the symbol $\Sigma\,[(\text{hp.})^2 \times t]$, where t = individual time interval. Σ signifies a summation. This measure of the heat needs to be translated in terms of continuous load if it is to be of any use. This continuous load is called "root mean square horsepower, or R.M.S." It represents the horsepower necessary when applied constantly over a cycle of operation to produce the same amount of *heat* as found by $\Sigma\,[(\text{hp.})^2 \times t]$. If T represents the flat time, or cycle of operation, the R.M.S. is found by extracting the square root of $\dfrac{\Sigma\,[(\text{hp.})^2 \times t]}{T}$

Thus $\sqrt{\dfrac{\Sigma\,[(\text{hp.})^2 \times t]}{T}} = \text{R.M.S.}$

The peak load for a given set-up of tooling is calculated from the horsepower formula, $\text{hp.} = \dfrac{W \times F \times C_R \times S}{33{,}000}$

W = depth or width of cut, in.; F = feed in in.; C_R = cutting resistance pounds per sq.in. of the material being machined; S = surface speed.

A summary of the above allows us to establish the following rule: *An intermittent load may be driven by a motor of a continuously rated horsepower if: (a) The motor horsepower (continuous rating) exceeds the R.M.S. horsepower of the load; (b) The maximum torque of the motor is sufficient to meet the maximum torque requirement of the load.*

Part II of this article will appear in a subsequent number.

Ford Fixtures and Special Tools

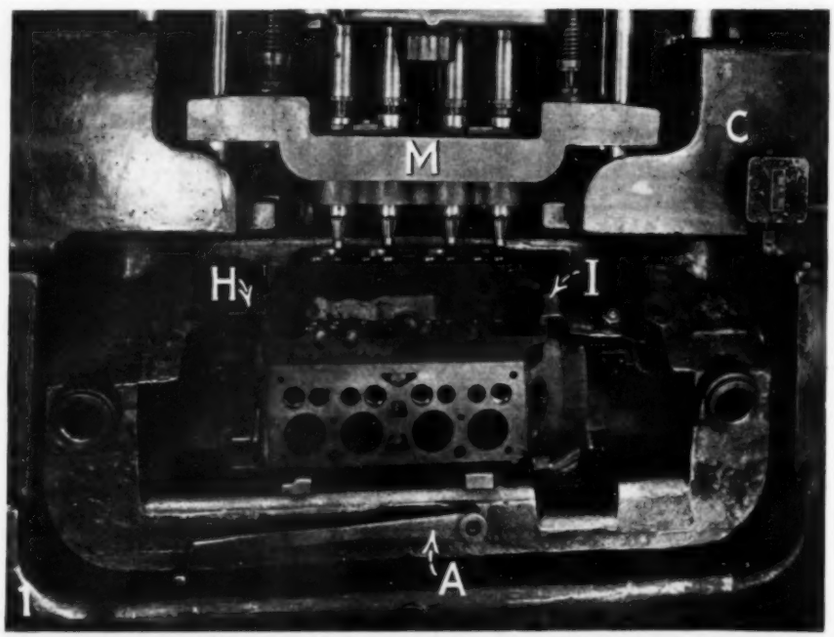
Fixtures that carry a V-8 cylinder block must be rigid to prevent deflection and must index positively in two positions. In addition, the block must be moved endwise automatically to position the offset correctly

THE ACCURATE production of even simple parts in quantity, and at costs that are satisfactorily low, requires the best fixtures that can be designed and built. When the part to be machined is as complicated as the unit cylinder block of the Ford V-8 engine, the problem of designing suitable fixtures becomes increasingly important. For, in addition to the holding of the work in proper relation to the tools for performing the various operations, there is the problem of locating and clamping, and of preventing distortion caused by the weight of the cylinder block and the pressure of the fixture itself, as well as the thrust of the cutting tools.

Careful study of all the factors involved led to the adoption of the cradle type of fixture for a number of operations. The design and use of these fixtures are shown herewith. In Fig. 1 the engine block is in place in the fixture which is positioned for counterboring the valve chambers for the insertion of the tungsten alloy valve seats. The counterbores have been made in the other bank of cylinders, as can be seen.

Some of the details of construction and design of this fixture can be seen in Fig. 2, where the fixture has been indexed for work on the other bank of cylinders. This shows the substantial ribbing of the under side of the fixture as well as the way in which the work-locking mechanism operates. It also shows the substantial bearing in the center of the cradle to prevent sagging of the long cradle and consequent distortion of the work. The handle *A* carries a pinion *B* which operates a gear that turns the crossbar *C*. This crossbar operates both end clamps through the bell cranks *D* and *E*.

The clamps themselves are shown at *H* and *I* in Figs. 1 and 3. Clamp *H* swings directly down on the end of the manifold surface, while clamp *I* can be swung out of the way, as in Fig. 3, to make it easy to load the



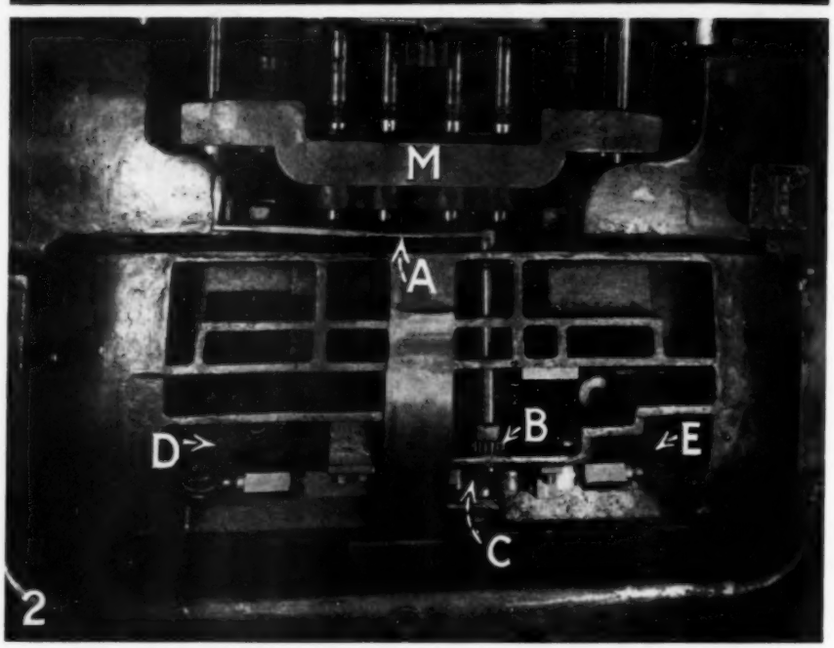
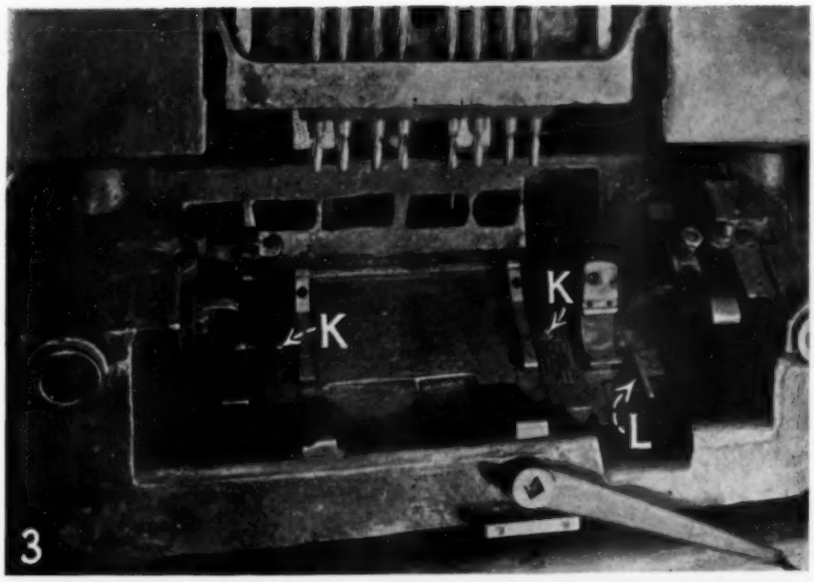
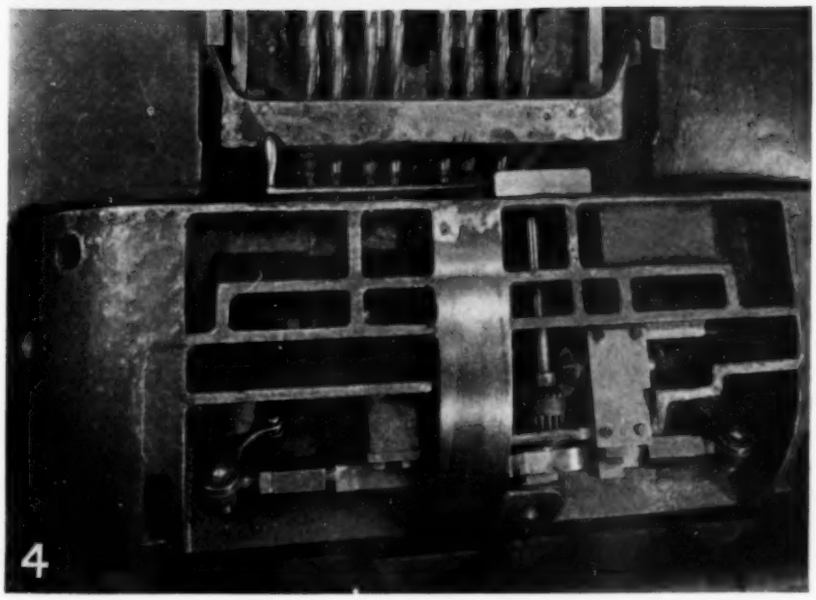


Fig. 1—This substantial trunnion fixture holds the V-8 cylinder block. The positive location by two pilot bars and support of tools close to work insures accuracy. Fig. 2—Here are shown the stiffening ribs, the center support and how the locking controls are operated





fixture or to remove the work. Fig. 3 shows the upper side of the cradle before the cylinder block is in place, with the usual dowel pins *K* for locating the block from two reamed holes in the crankcase flange. The block *L* helps in locating the block as when being put into place.

After the necessary machining is done on one bank of cylinders, and the tools have been withdrawn, a suitable hydraulic mechanism turns the cradle 101 deg. 28 min. and at the same time moves it sidewise 7/8 in. This side movement is to allow for the offset necessary for the two connecting rods on each of the four crankpins. The side or end shift is accomplished by a cam on the trunnion of the cradle; which insures a positive movement of just the right amount.

In addition to the hydraulic control the relative position of fixture and tools is made positive by the substantial guide bars and bushings shown in the various views. The tools in each work spindle are also supported in the heavy cross member *M*, which is in turn guided on the bars at each side. When the work head of the machine is fed down to the cylinder block the side bars lock the cradle in position in addition to the lock in the fixture itself, and insure accurate positioning.

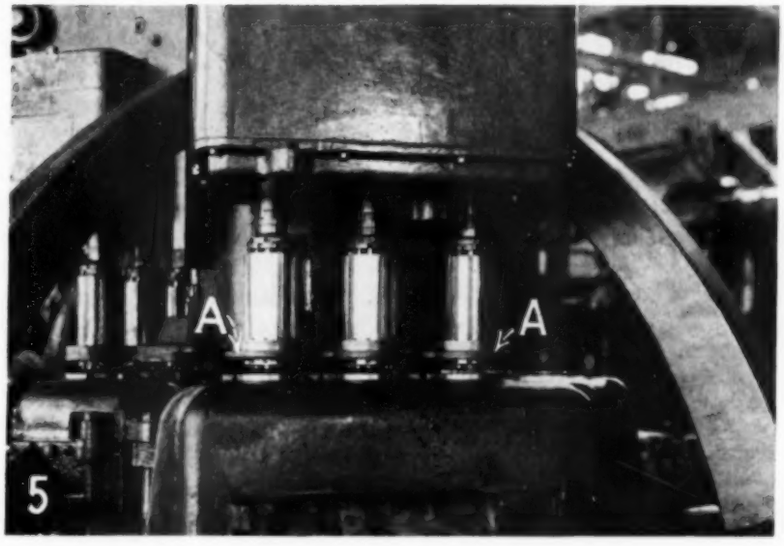
A similar fixture is seen in Fig. 4. The difference is in the addition of two pairs of bevel gears to operate a vertical screw for a special positioning movement. It shows how the general design of this type of cradle fixture lends itself to many modifications. The hole through which the vertical screw operates can be seen in Fig. 2.

It will also be noted in Fig. 3 that

Fig. 3—More details of trunnion fixture, including locating dowels, ribbed base surface and locking clamps

Fig. 4—Similar construction but with additional locking devices by the use of bevel gears in same casting

Fig. 5—Three special hollow mills cut unusual bearing-cap locks in webs for crankshaft bearings



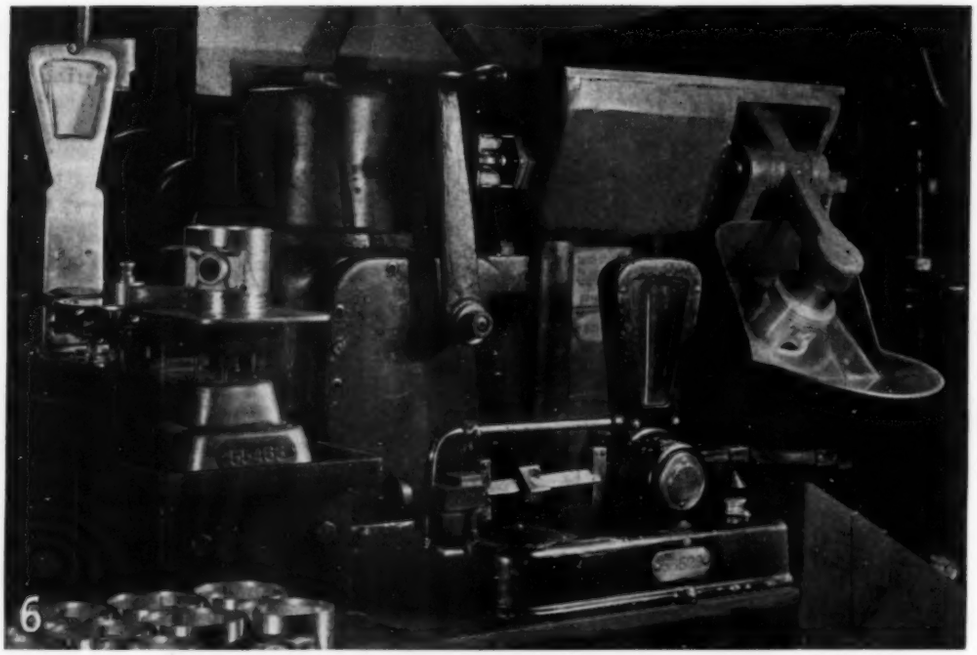


Fig. 6—Accurate scales mounted on a special machine help to eliminate variations in weight of pistons. The first scale shows amount of overweight. Metal removed from skirt is weighed in pan of second scale. When correct weight of chips is obtained the machine is stopped

the surfaces on which the ends of the cylinder block rest are not solid, but relieved to present a series of narrow bearing surfaces rather than a wide solid surface. Such a surface presents less opportunity for small particles of dirt or chips to lodge on the bearing surface and interfere with the accurate seating of the work. The universal use of hollow head capscrews is also noticeable both as adding to the appearance of the fixtures and as being out of the way wherever used.

To insure the positive location of the caps on the main bearings, they are positioned by projections that lock them in place but yet permit any movement necessary for perfect alignment. The lock is secured by hollow milling the bearing seats in the cylinder block on the special 3-station machine in Fig. 5.

These hollow mills are guided at their lower end, both by the supports at *A* that are bolted to the center column of the machine and by substantial bushings in the fixture itself. Two of the machine stations carry hollow mills while the third station is for loading and unloading.

Selection and sorting of pistons both by size and weight adds complications in both inspection and assembly departments. One of these selections, that of weight, is obviated in the Ford plant by the special machine in Fig. 6, which makes all pistons of uniform weight.

Each piston is weighted on the scales at the left which shows variations to a total of 25 grams, on the heavy side. The weight of each piston is noted, after which it goes over the boring spindle as shown at the right. The piston is easily clamped under the arm shown and the boring tool starts to bore out the lower end of the skirt.

Before starting the boring operation the scales in the center have been set to the surplus weight of the piston, or the weight to be removed. The chips bored from the skirt fall in the pan of the scales, at the right. When the proper amount has been removed the pan drops, and automatically stops the boring operation. By this method the weight of all pistons is kept very uniform, and it is only necessary to sort for diameter.

After boring out the required amount of metal and stopping the machine, the surplus metal is dumped into the chute at the right, the scales reset for the next piston and the operation repeated.

Science and Practice of Metal Cutting—Correction

The formula which appeared on the third page of Dr. Erich Bickel's article (*AM*—Vol. 78. page 695) should read $N = \frac{P \times v}{\text{constant}}$ instead of containing the value P_v as originally printed.

High-Speed Tool Tips Discussion

THOMAS O. FORD

A short item (*AM*—Vol. 78, page 676) raises the question as to why a high-speed tip on a carbon steel shank will usually give better service than a solid high-speed steel tool. The explanation given, which attributes this effect to better conductivity in the tipped tool, will not hold much water. The difference in conductivity between the two steels is so slight as to give a negligible result, and any advantage in favor of the tipped tool would be offset by the joint between the two parts.

Tips are either bought, as in the case of the O.K. tool holders, or are homemade by drawing down short ends of larger high-speed stock. Since the O.K. and similar tips are formed under a press and the homemade tips are drawn under a hammer, in either case the tip receives considerable hot-working before heat-treatment. This working, as is commonly known, refines the grain structure and greatly adds to the effectiveness of the heat-treatment and the cutting qualities of the tip. Solid tools which are made from rolled high-speed stock do not have the same degree of hot working and hence are not likely to be so effective.

Grain refinement of the high-speed steel is a far more important factor than a slight difference in conductivity.

EDITORIALS

VOLUME 79 AMERICAN MACHINIST ESTABLISHED 1877 McGRAW-HILL PUBLISHING COMPANY, INC. NUMBER 1

K. H. CONDIT F. H. COLVIN
EDITORS

•

The Cycle Develops

AS ANOTHER NEW YEAR opens ahead those of us who are at all given to meditation cannot but be reminded once more that time is inexorable. And, further, that certain economic phenomena seem quite as impervious to our best efforts—the business cycle, for instance.

When the last boom reached its peak and the inevitable collapse followed we used every device known to our business, financial and political leaders to stay its course. A Republican administration found itself futile in the face of the forces of depression, and the succeeding Democratic one has been just about as ineffective in turning the tide. When the time came the tide turned, largely of itself, and we started to stagger upward once more.

There are still many among us who refuse to believe that any measure of recovery has been achieved, but the figures do not support them. Certainly there has been a marked improvement in the consumer goods industries, a movement that culminated in the best Christmas trade in years. The encouraging increase in sales of automobiles and motor trucks, the record year for domestic refrigerator sales, and corresponding advances in radio sales are further evidence that the consumer goods cycle has developed a strong trend toward recovery.

In the capital goods industries there has also been some small advance from the lows of last year. Many a machinery company which has been in the red for three years will break even for 1934 or perhaps show a small profit. But as a whole the real revival in this great section of industry is still to come. There is every indication that it will move forward haltingly during the first half of 1935 and more vigorously during the last half.

One reason for this statement is that real progress has been made in bringing the unbalanced price structure back into equilibrium. Farm prices are up enough to offset volume losses, and more besides. Raw material prices have increased relative to prices for finished goods. Real per-capita earnings of manufacturing labor are up from last year, although still not what they should be. In fact, a series of ten elements in the price structure shows improvement in every single element.

LABOR TROUBLES are probably in store for us, and no one can tell what Congress may do. NRA is still with us, and we may have unemployment insurance and old age pensions on top of it. The railroads are far from happy, and private building construction is a feeble thing.

But still the cycle develops and we shall have to do something very foolish indeed to delay it. We can do much to help it if we will forget our selfish interests and adopt a spirit of give and take. Let us make that our New Year's resolution.

Volume 79

AS *American Machinist* begins its 58th year of continuous usefulness to the metal-working industry, a new volume, Number 79, is opened. Started in 1877 by Horace B. Miller, with Jackson Bailey as editor, it has been edited successively by Frank F. Hemenway, Fred J. Miller, Frederick A. Halsey, Leon P. Alford, John Van Deventer and Ethan Viall. The present editorial staff includes Kenneth H. Condit and Fred H. Colvin, editors; John Haydock, managing editor; S. Ashton Hand, associate editor; H. R. Le Grand, assistant editor; Paul Wooton, Washington; Leonard Church, Cleveland; and Charles B. Gordy, Detroit.

Air Corps Needs

GENERAL FOULOIS' conservatively stated account of the condition of equipment in the repair and maintenance shops of the Army Air Corps, page 4, indicates another place where government cash can be spent to very good advantage. Young as aviation is it has lived long enough to accumulate repair equipment that is obsolete, and that should be replaced, in the interest of both economy and safety. We suggest calling the situation to the attention of your Congressmen.

. CHIPS .

Washington—Utility brief is presented to the President and draws fire from McNinch of the Power Commission . . . Recovery plan of U S C of C and NAM conferees is left at White House by Judge Ames and arouses ire of Ickes and Hopkins . . . Bills supported by Roosevelt to be "labeled" for Congress . . . Determination of Roosevelt to reduce electric power rates is evidenced again as he supports LaGuardia plan for New York municipal plants . . . Dern reports plans of Army engineers for $8,000,000,000 public works if wanted . . . War Department is against nationalization of munition plans, would abrogate Section 7(a) of NIRA in time of war . . . Treasury directed to study duplication of taxes prefatory to a general conference on the subject to be held next summer . . . Old age pension plan sent to Roosevelt by the Perkins Committee . . . Baruch urges purchase and storage of tin for war reserve . . . Conference Board studies FERA figures and finds that work relief, per case, costs 50 per cent more than direct relief . . . Court restrains PWA from loaning funds to build parallel city power plant in Idaho . . . Lumber Code price-fixing scheme is suspended by NRA as unenforceable . . . Mississippi Valley Commission recommends nation-wide pool of electric power (Giant Power again).

Foreign—Japanese officially denounce naval treaty . . . Soviet executions continue as Stalin stamps out leftist revolt, Kamenev and Zinoviev arrested . . . Saar quieter as Italian, Dutch and British contingents move in to police plebiscite, border is closed . . . Move in French Chamber of Deputies to investigate armament firms . . . Britain and U.S. draw closer together on naval matters as discussions end . . . Struggle for possession of oil fields creates dangerous situation between Italy and Abyssinia.

Finance—President asks 44 states to revise mortgage laws . . . Wagner wants billion for HOLC . . . RFC likely to be only body to handle industry loans . . . Loans to Erie and Milwaukee roads approved . . . Brookings Institution will try to find out where excess savings of 30 years went to . . . SEC regulations governing uniform corporation annual statements will probably supersede Stock Exchange rules . . . Brookings Institution economists condemn NIRA as brake on recovery.

Industry—Frigidaire spends $1,600,000 to retool plants for production of 500,000 refrigerators in 1935 . . . Receivers appointed for huge Citröen plant as Flandin refuses government aid . . . FHA reports that better than 90 per cent fulfillment of modernization pledges is being recorded . . . Association of American Railroads plans freight car pool to save $100,000,000 yearly . . . Corporations in various lines pay bonuses, some raise wages . . . Employment off 86,000 in November . . . Steel mills in several districts forced to shorten Christmas holiday because of rush of orders . . . Important chromite deposits in Philippines would supply us with chromium in case of need . . . Increase in nickel consumption brings total close to 1929 record.

Trade—Christmas sales 20 per cent ahead of those of last year, some cities report new records . . . Exports for 9 months show considerable increase over last year . . . Brazil, Colombia and Haiti trade treaties ready to sign . . . Roosevelt favors extending TVA electrical equipment purchase aid plan to privately owned companies.

Indicators—Steel production continues to expand to meet demands of automobile, farm implement and other manufacturing calls . . . Business Week index rises further to 61.9.

Series of NRA Meetings May Serve As Basis for Revised Industrial Laws

WASHINGTON—On January 9 a series of NRA policy hearings will be launched with a discussion of price fixing under the chairmanship of S. Clay Williams, chairman of the National Industrial Recovery Board. Fundamental new policies, as well as the views of influential recovery officials on revisions to be effected in the law are expected to be revealed.

In Washington, the alleged purpose of the meetings, to hear advice from the public on major NRA policies and problems, is viewed rather skeptically because of the board's announcement that it will state its own views, already formulated, at the beginning of each hearing. However, the very fact of the board's promise to show its hand may mark the beginning of public expression on the future of NIRA, a policy discussed under cover for months by high administration officials.

Plans for Permanent Law

Despite reluctance of the NRA board to comment on its forthcoming recommendations to the President, some definite indications of policy have already been revealed. Objectives for a permanent NIRA now clearly include simplicity of code structures, code coordination and merging into a smaller total, more vigorous compliance through court action, continuance of labor relations, but sharp sorting of trade practice rules for the purpose of discarding all except those of proved value. Some of these aims will be achieved administratively; others will await revision of the law.

The recent decision to denounce price fixing and to recommend little or no provision for such regulation in the permanent law, is the first result of the sorting over of trade practice rules. NRA holds that natural resource industries constitute a special problem, and does not include them in recommending abolition of price rules.

As yet, according to Chairman Williams, the board has no policy on production control. Here again natural resources are a separate problem, with conservation an important consideration. Officials unite in favoring continuation of minimum wages and maximum work hours, bans on child labor, and the right of collective bargaining.

Definitely favoring code simplification, NRA has charted code provisions for the purpose of asking industries to make sweeping revisions in their codes to bring them into line with each other. Some hope for results is held out in public comment; privately, not much. Difficulties of simplifying codes through administrative action indicate a strong likelihood that revision of NIRA will find more specific rules governing the appearance and administration of codes than are contained in the present law.

Major problems sure to be the subject of controversy when Congress takes up its task of revision include the ambitions of various governmental departments for jurisdiction over NRA, separation of natural resource industries, segregation of collective bargaining under a new act, and battles of labor for more power in NRA.

The Department of Commerce is jealous of NRA and would like to take it over. So would the Federal Trade Commission, which fears weakening of the anti-trust laws, and has gone right ahead, the latest example being the wholesale drug case, with approval of trade practice agreements despite NRA fair practice codes. The Labor Department wants control of labor sections of the Act. This means a battle, probably lost all around, as one reason NRA was constituted as a separate agency was because the administration did not desire to turn over such power to any of its existing agencies. NRA favors continuation as a separate organization, with board rather than one man rule; so does Donald Richberg, according to his frequent eulogies of the present administrative system.

Fight Looms on 7a

Separation of Section 7a from the NIRA will center in this Congressional session around revival of the labor disputes bill, for which the existing Joint Resolution 44 setting up the Labor Board was a substitute. However, strengthening of this organization as an independent unit would not necessarily result in removal of collective bargaining from NIRA, where it might serve importantly as a second string to the government's labor bow. Industry and labor will fight in Congress over rewording of Section 7a. Mr. Richberg likes it as it is.

Labor's vigorous fight during the coming session for more power is clearly shown in the recommendations to the NRA Board by the Labor Advisory Board, made up chiefly of American Federation of Labor officials. First is the demand for equal representation on the governing body of NRA, likely to be fairly well preserved, judging from the stress laid by the Administration on the value of a balance of interests within the administrative agency. However, requests for equal representation on code authorities is another matter, NRA having consistently held that labor should show a greater sense of responsibility to the public good and to peaceful relations with business before demanding further powers.

Demands for the right to help impose codes probably will not be considered. This is a power lodged only with the President and even there never yet used, though indications now are that it still may be. Code imposition is a mighty, and perhaps two-edged weapon, which the chief executive probably will keep for himself.

Minimum Wages in Higher Brackets

Minimum wages for skilled workers were once opposed by powerful factions within the ranks of organized labor itself on the grounds that such regulations should be established through collective bargaining, and that if named in codes they leave nothing to bargain for, and make unions virtually useless. Strong pressure for skilled minimums at this time reveals a disillusionment with the results of Section 7a and the wish for detailed code rules as a last resort against developments under NRA which, while raising the pay of unskilled labor, have allegedly lowered income in the higher brackets.

Enough is now known of the policies of the new governor of the Federal Reserve to reveal that he believes a large spending program to be the best weapon to use to break the depression. He is positive the inflationary effect of a mounting deficit can be kept under control.

Apparently the Federal Reserve Board would like to transfer all responsibility for direct loans to industry to the Reconstruction Finance Corporation, but until that question is decided by Congress, the Reserve banks are being urged to be extremely liberal. Even if losses result, it is pointed out they are socialized through the absorption of 80 per cent of the amount by the Federal Reserve. The banks are being urged to make sure that they do not err in lack of liberality in considering direct loans.

Arguments against social legislation are futile because such laws will find their way to the statute books before the end of the fiscal year. The old age

pension law is certain to be much more thoroughgoing than the unemployment insurance act. Obstacles in the path of unemployment insurance are so many that nothing more than a start on such a plan may be expected. Great care will be exercised, in view of what happened to the railroad pensions, to avoid anything that might be found unconstitutional. Old age pensions will take the form of federal aid to states that will make their systems conform to regulations the federal government will lay down.

Machinery Development To Be S. A. E. Topic

At the Book Cadillac Hotel, Detroit, the Society of Automotive Engineers will hold its annual meeting on January 14-18. A production symposium which will be held at 8 p. m. on January 18 will have as its general topic "Recent Outstanding Developments in Production Machinery and Methods."

Papers to be presented at this session are as follows: "What is Surface Finish and How Can It Be Measured?"—E. J. Abbott, University of Michigan; "Surface Integrity and Dynamic Strength,"—A. V. de Forest, Massachusetts Institute of Technology; "Conjugate Camshaft Grinding Machine,"—Howard Dunbar, The Norton Co.; "Single Point Boring of Cylinders and Diamond Turning of Pistons,"—W. F. Wise, Ex-Cell-O Aircraft & Tool Corp.; "Improving Machinability of Alloy Steels,"—W. E. Sanders, Delco Products Corp.; "Triple-Action-Drawing and Redrawing Presses,"—F. J. Rode, M. R. Hatch and E. V. Crane, The Toledo Machine and Tool Co.; "Modern Resistance Welding in the Automobile Industry,"—P. W. Fassler, P. W. Fassler & Co.

Stout and Turner to Speak At S. A. E. Annual Dinner

Members of the Society of Automotive Engineers at their 30th annual dinner at the Hotel Commodore, New York, January 7, will be addressed by W. B. Stout, and Colonel Roscoe Turner. D. G. Roos, president of the society will preside.

Mr. Stout will tell what automotive engineers and other technicians can do to remake the world. Colonel Turner will fly east from California to appear at the dinner, bringing motion pictures of his recent England-to-Australia flight for the Melbourne Centenary Prizes in which he finished third with a standard transport plane.

***Drilling Feet*—One of the many operations in making the motors to drive Henry Ford's new steel mill is drilling frame feet. The one shown is for the 400 hp. 300-600 r.p.m. motor which will drive the scale breaker on the 56-in. hot strip mill. This photo was made at the East Pittsburgh Works of Westinghouse Electric and Mfg. Co.**

E. B. Meyer Nominated for A. I. E. E. Presidency

The American Institue of Electrical Engineers, through its national nominating committee, has selected the following slate of candidates for offices becoming vacant August 1, 1935:

For president—E. B. Meyer, vice-president, United Engineers and Constructors, Inc.

For vice-presidents—W. H. Harrison, vice-president, Bell Telephone Co., of Pennsylvania; Mark Eldredge, chief engineer, Memphis Power & Light Co.; R. H. Fair, plant operations supervisor, Northwestern Bell Telephone Co.; N. B. Hinson, chief engineer, Southern California Edison Co.; C. V. Christie, professor of electrical engineering, McGill University.

For directors—C. R. Jones, Northeastern Transportation Manager, Westinghouse Electric & Manufacturing Co.; W. B. Kouwenhoven, professor of Electrical Engineering, Johns Hopkins University, G. C. Shaad, Dean, School of Engineering and Architecture, University of Kansas.

For national treasurer—W. I. Slichter, professor of Electrical Engineering, Columbia University.

Dr. Willis R. Whitney, vice-president in charge of research, General Electric Co., has been awarded the Edison medal for 1934 "for his contributions to electrical science, his pioneer inventions, and his inspiring leadership in research." The medal will be presented to Dr. Whitney during the winter convention of the A. I. E. E., to be held in the Engineering Societies Building, New York, January 22-25.

Durable Goods Topic of Engineering Council

One of the features of the annual meeting of the American Engineering Council, to be held at the Mayflower Hotel, Washington, D. C., January 10-12, will be a symposium on the outlook for the durable goods industry. Ralph E. Flanders, president of Jones & Lamson Machine Co., and president of the American Society of Mechanical Engineers, will preside. A discussion of government plans will be participated in by representatives of the Federal Reserve, Federal Housing, Department of Commerce and other government departments. A. J. Hammond, past president, American Society of Civil Engineers, will conduct a symposium on public works.

A conference of secretaries of engineering societies will be held in conjunction with the Council meeting. This conference will be addressed on "Present Trends in Engineering Organization" by Frederick M. Feiker, executive secretary, American Engineering Council. Mr. and Mrs. Feiker will hold an informal reception for J. F. Coleman, president of the American Engineering Council, and Mrs. Coleman.

Foundry Equipment Sales Make 45 Per Cent Gain

Following the sharpest single month's rise of the year, the index of foundry equipment orders rose from 55.3 in October to 80.4 in November, which compares with 36.6 for the corresponding month of last year. Shipments at 59.6 for November show an improvement over figures for the preceding month and for a year ago which were 51.5 and 38.3 respectively.

At 69.7 unfilled orders also reflect marked improvement in this field, contrasting with 49.1 for October and 29.6 for November, 1933. The three months' average of gross orders rose from 48.3 to 60.7 as against 38.0 a year ago.

Twenty-one companies of the Foundry Equipment Manufacturers Association contributed to this report.

Detroit Is Optimistic for 1935 As New York Auto Show Date Nears

DETROIT—At this time of year interest centers in prospects for 1935. These prospects, when evaluated against the background of 1934, have a substantial basis in fact, as contracts already let for parts to be supplied on new cars run substantially higher.

With November and December estimated, truck registrations for 1934 are expected to total slightly over 400,000 units, or approximately equal to the 410,699 registered in 1930, thus representing the third greatest year in the industry. Passenger car registrations, again with the last two months estimated, should come close to 1,950,000, the best year since 1930, when 2,625,979 were registered.

Department of Commerce figures on the first ten months' exports are the latest such figures available; these show that the demand for automotive products reached a total of $171,997,928 in 1934, representing a 124 per cent increase over the $76,617,086 reported for the first 10 months of 1933. General Motors sales abroad in the first eleven months of 1934 represented an 81.4 per cent increase over 1933, this volume including sales from American, English and German factories.

December schedules on new cars are being rushed to stock dealers in time for the general announcements on January 5. Ford plans were announced December 29. Dodge, Buick, Studebaker, Hudson, Hupp and Plymouth lifted the veil in late December, while merchandising plans of others were reserved for the show. A preview of the light Packard was not held.

Buick and Pontiac report a December run of over 5,000 each. Advance dealer orders for Chrysler products are stated to be for 100,600 units.

New Sales Features

As announcements and previews accumulate, it is becoming evident that the composite picture of the 1935 car attempted in the last issue is substantially correct. The "turret top" is the name adopted for the change made in the General Motors bodies in which presses of 650 tons capacity form from a sheet the top section from the windshield to a point around the rear window, steel ribs and a layer of insulating material replacing the old construction.

Hudson adds an "electric hand" to its 1935 line which elevates the shifting job conveniently near the normal position of the right hand on the steering wheel. Plymouth and Dodge advance the engine several inches forward, using a soft spring from a new steel with a lower deflection rate. Extension of the water jacket to the top of the crank case to reduce thermal distortion caused by the piston travelling through different temperature zones is to receive new adherents in Plymouth and Dodge; this feature has been a part of the Graham, Studebaker and Ford engines for some time. While the supercharger is being investigated by some not at present using it, it is not likely to be added to early 1935 cars.

Body details, ride improvement and projection of several models of established makers into the low and near low price class seem at present to constitute the outstanding trends, for 1935. By advancing the front spring and engine over the front axle 8 in. of space is gained by the Ford, and passengers sit between the axles, that ride qualities may be improved. Ford prices are slightly changed from those of 1934 but owners of present models will not find their cars obsolete, which should receive some sort of a reward for truth in advertising.

Leaf Springs Retained

With the use of a front leaf spring by Plymouth and Dodge, the standard Chevrolet and the Ford, it is evident that the leaf spring manufacturers still have the tonnage business in the new year. Many others, including Studebaker, Hudson and Hupp, are in the same back yard.

Some part suppliers report 1935 contracts signed from November 15 to early December. While on a requirements basis these represent substantial increases over 1934, prices in some cases, however, have been cut as much as 40 per cent due to failure of codes and pressure of buyers. Manufacturers of production tools, such as cutters, reamers and drills, are reporting volume business with an optimistic outlook. Tool shops are encouraged by new business filtering into this area within the

• INDUSTRIAL REVIEW •

• With few exceptions machinery men enter the new year with much more optimism than seemed possible a few weeks ago. The fourth quarter of 1934 was distinctly better than the third, and the next quarter is expected to be better still. An indication of the hopeful feeling about orders is the frequently expressed worry as to how the builders are going to get the necessary skilled men to fill their orders as the year continues.

• New York, Boston and Philadelphia distributors of machine tools booked some substantial government orders during December, but even so they are looking to 1935 for appreciable increases in business. Inquiries are strong and early closings are anticipated. Pittsburgh expects the first quarter of 1935 to be better than the first quarter of 1934. Inquiries are still for one or two machines but they are more numerous. In Cleveland there is a strong feeling that 1935 as a whole will be far better than 1934. Trouble over orders placed at the last moment, and difficult to fill, is anticipated.

• Cincinnati reports more inquiries and better chances of closing on them. The machine tool outlook is looked upon as encouraging at least for the first six months. The supply business in Detroit is active and is expected to continue so for several months. Machine tool sales during the last 30 days have been good and more are in prospect. Demand for standard machine tools is picking up. Chicago distributors had a good December and are looking for the best business in several years during the first part of 1935.

• Toledo reports no retooling programs of major importance but expects general improvement in 1935. St. Louis is looking forward to increasing business in all lines, especially if the President is able to keep Congress on the track. Milwaukee, on the other hand, is not so cheerful. There was a slowing up in December that may continue. Out on the Pacific Coast Christmas buying was up 17 per cent from 1933. Government projects are reducing unemployment but there is no definite sign of outstanding business activity.

past few weeks from car makers who have already announced showings for January 5, which suggests additions to lines sometime in the spring.

It is reported that additions and changes are being made in the Ford processes which will bring production up to 5,000 in 16 hours. This development is the support of the machine tool business at present. Buying, for the past several months, has been on the basis of adding new equipment only to care for engineering changes. Should anticipated increases in schedules materialize some new machine business must come since present equipment, in numerous spots in every factory, will not stand the gaff. Equipment which is capable of performing in one operation what now requires several machines will be in demand if volume and profits are to be secured in the low priced field.

The pricing of new models this year meets a new condition in the industry. For years there has been hesitancy in naming new prices and many are the grape vine routes constructed to get advanced information as to what competitors will do. Informed opinion in the industry anticipates some form of unemployment insurance from the new Congress. If this is financed by a payroll tax, it represents a new item of cost.

With the NRA code hearings held in Detroit on the 15th and 16th of December, it is evident that public opinion is being focused on production irregularities in the industry and the social desirability of mitigating them. There is small likelihood that any one brilliant idea will emerge as a solution, but the answer will probably be a composite of many things such as modification of the present dominant sales viewpoint, better scheduling, improved foremanship, interchange of some body dies beween different manufacturers, and many others not now evident. The open hearings, attended only by labor organizations, stressed irregularity of employment and earnings and in general united in a demand for an annual wage. The frequently repeated disbelief by these organizations that good will come out of the study is contrary to results achieved by the pressure of public opinion in the past.

With the exception of the A. F. of L. especially, which organization considers it has more to gain from the National Labor Board, the Automotive Labor Board is considered to exert a progressive influence. In the first proportional election held by it at the Cadillac plant, 1,176 of the 1,593 votes cast expressed no preference for any specific labor organization. In one of the sixteen districts enough votes were received by Father Coughlin to place him in nomination for the final election December 28.

W. J. McAneeny, former president of the Hudson Motor Co., has been elected president of Hupp.

Czechoslavak Machinery Exports Rise Sharply

According to Sam E. Woods, commercial attache of the Bureau of Foreign and Domestic Commerce, Czechoslovak exports of machinery were valued at 153,962,000 crowns ($6,168,400) for the first ten months of 1934, an increase of 62 per cent.

The Skoda Works, one of the largest local machinery concerns, is reported to have received new orders in a total value of 200,000,000 crowns ($8,000,000), and a number of other machinery concerns report considerable increases in production. The devaluation of the Czechoslovak crown, which took place on February 17, 1934, had unquestionably a favorable influence.

Approved Codes in the Metal-Working Industry

(Continued from AM—Vol. 78, page 540f)

Code Sponsor	Maximum Hours	Minimum Wage	Deputy Administrator	Approval Date
Industrial Oil Burning Equipment Association	40	40c.; office workers $15	Foster	July 31
Wire Cloth Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South	King	July 31
Refrigerating Machinery Association	40	36 to 40c. depending on population; 32c. in South; division of MAPI	King	July 31
Hand Bag Frame Manufacturers Association	40	40c. male, 35c. female, North; 35c. male, 30c. female South, division of MAPI	Horner	August 1
Diesel Engine Manufacturers Association	40	36 to 40c. depending on population; 32c. in South; division of MAPI	Muir	August 2
Jack Manufacturers Association	40	36 to 40c. depending on population; 32c. in South; division of MAPI	King	August 2
Railway Appliance Manufacturers Association	40	36 to 40c. depending on population; 32c. in South, divlsion of MAPI	King	August 2
Hydraulic Machinery Manufacturers Association	40	36 to 40c. depending on population; 32c. in South; division of MAPI	King	August 4
Pulp and Paper Machinery Industry	40	36 to 40c. depending on population; 32c. in South; division of MAPI	Martin	August 13
Association of Manufacturers of Upward-Acting Doors	36	40c.; office workers $15	Foster	August 13
Master Electro-Platers Institute	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Horner	August 22
Pipe Tool Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Horner	August 24
Marine Equipment Manufacturers Association	40	40c. North; 32½c. South	Dilworth	August 27
Corrugated Rolled-Metal Culvert Pipe Association	40	40c. to 30c. depending on district	Hickling	August 28
Association of Limb Manufacturers of America	40	40c. office workers $15	Dahlberg	August 28
Perforated Metal Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Horner	August 31
Socket Screw Products Bureau	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	King	September 4
Vise Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Horner	September 4
American Alloy Producers Association	40	40c. North; 30c. South; office workers $15	Janssen	September 5
Refrigeration Valves and Fittings Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Horner	September 6
Institute of Tubular Split and Outside Pronged Rivet Mfrs.	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	King	September 22
Distillate Burner Manufacturers Association	40	40c. male, 35c. female North; 35c. male, 30c. female South; division of FMPF	Foster	September 24
Sawmill Machinery Manufacturers Association	40	36 to 40c. depending on population, 32c. in South; division of MAPI	King	October 13
Floor Machine Manufacturers Association	40	40c., office workers $15	Dilworth	October 18
Cereal Machinery Association	40	36 to 40c. depending on population; 32c. in South	King	November 17

Clock Company Makes 3-Year Safety Record

On December 13, the Western Clock Co., employing 2,300 people, completed its third consecutive year without a single lost time accident. During this period a grand total of well over 10,000,000 man-hours were amassed.

In recognition of this record the company was awarded a certificate of achievement by the National Safety Council. The remarkable showing was not caused by chance, but because of precautions taken on the part of the management and the cooperation of the employees.

Soviet Orders Rise In Great Britain

According to the *Monthly Review*, issued by Moscow Narodny Bank Ltd., orders placed in Great Britain during October amounted to £574,466, as compared with £506,202, in October 1933, an increase of 13.5 per cent. Orders placed in the first ten months of this year total £8,337,203, which was 130 per cent over the corresponding figure for 1933. Of this total, machinery and equipment accounted for £1,263,614 for the first ten months of 1934, as compared to £304,395 for the corresponding period in the preceding year.

• PERSONALS •

M. L. Eckman, formerly engineer for the Federal Machine & Welder Co., has been chosen to head the research and development department of the Thomson-Gibb Electric Welding Co., Lynn, Mass. Complete facilities have been given to him for the purpose of assisting manufacturers in working out production problems.

John Kirby, formerly special assistant to Dr. Wilson Compton, former chief of the NRA Trade Association Division, and later assistant to Wharton Clay, Dr. Compton's successor, has joined the staff of the Refrigerating Machinery Association with headquarters in Washington. In his new post Mr. Kirby will be actively engaged in the administration of the Refrigerating Machinery Industry Code as assistant to William B. Henderson, the code authority's secretary-treasurer.

G. Arthur Schieren, president of Chas. A. Schieren Co., New York, has been elected president of the American Leather Belting Association.

Metal-Working Code Hearings Scheduled

Date	Place	Deputy Administrator	Association
Jan. 10	Raleigh Hotel	B. S. King	Industrial Oil Burning Equipment (amendment proposal)
Jan. 11	Hamilton Hotel	Niklason	Metal Roof Deck Manufacturers (Division of FMPF) (amendment proposal)
Jan. 11	Willard Hotel	J. G. Roberts	National Commercial Vehicle Body (amendment proposal)

ROBERT F. McCLOSKEY

Robert F. McCloskey, previously general superintendent, has been elected director and vice-president in charge of operations of the Blaw-Knox Co., with plant located at Blawnox, Pa. Mr. McCloskey succeeds Wayne Rawley, deceased. He has been associated with the company since 1920, starting as manager of a plant then located at Wheatland, Pa. In 1922 he was made production manager of shops at Blawnox, and in 1931 became general superintendent.

Norman O. Wynkoop, publishing director of *Power*, a McGraw-Hill Publication, has been elected president of the Exhibitors Advisory Council, Inc., 330 West 42nd St., New York, N. Y. The council is composed of important industrial companies that are interested in improving conditions relating to shows and exhibits.

Allen R. Kelso has been appointed factory manager of the Motor Products Corp., Detroit. He was formerly factory manager of the Continental Motors Corp., Muskegon, Mich.

Charles A. Van Dusen, formerly factory manager of the Glenn L. Martin Co., Baltimore, has been appointed factory manager of the Consolidated Aircraft Corp., Buffalo.

• OBITUARIES •

William Cameron, president of the Cameron Can Machine Co., Chicago, died Dec. 21.

Walter MacLeod, president of the MacLeod Co., manufacturers of sand blast equipment and foundry supplies, died December 18.

Fred. W. C. Neuner, 44, co-owner of the Connersville (Indiana) Tool & Die Co., died recently.

Herbert Olds, chief inspector of the Erie, Pa. works of the General Electric Co., and identified with that company since 1898, died December 17.

Thomas Prosser, 80, senior member of the firm Thomas Prosser & Son, 15 Gold St., New York, N. Y., died December 23. Richard Prosser now becomes head of the firm, which was established nearly 100 years ago.

Vernon Royle, president and treasurer of John Royle & Sons, Paterson, N. J., machinery manufacturer, died Dec. 17. He held more than 100 patents on mechanical devices and processes.

• BUSINESS ITEMS •

The Poole Foundry & Machine Co. has appointed the Nibling Engineering Sales Co., 309 Colonial Bldg., Philadelphia, as representatives for the sale of flexible couplings and speed reducers.

Stockholders of the Marlin-Rockwell Corp., Jamestown, N. Y., voted December 17 to reorganize as a Delaware corporation, instead of a New York concern, to permit economies in operating costs by consolidating two subsidiaries, the Standard Steel & Bearings Co., and the Strom Bearings Co.

The name of the Borden Co., Warren, Ohio, makers of pipe tools, has been changed to Beaver Pipe Tools, Inc., as a more descriptive name and to prevent confusion with the milk products company of the same name.

The Dumore Co., Racine, Wis., manufacturer of motors, has acquired a larger factory building at 14th, Racine and Clark Sts.

Henry Pels & Co., New York, importers of shears, punches and heavy presses, has appointed the Austin-Hastings Co., ParKett Machinery Division, Cambridge, Mass., as distributors for the New England territory.

Canadian Atlas Diesel Engines, Ltd., capitalized at $50,000, has been incorporated to engage in the manufacture of engines and machinery. Offices are at 314 Hall Bldg., 789 West Pender St., Vancouver, B. C.

• EXPORT • OPPORTUNITIES

Panitsas & Pitouropoulos, 72 Rue Saint Andre, Patras, Greece, wish to get in touch with manufacturers of machinery for producing shoe nails.

*8028. Montreal, Canada. Tools (hammers, saws, screwdrivers, chisels); table and kitchen cutlery, plated and stainless steel; carving sets.

*8027. Cairo, Egypt. Heating and air-conditioning equipment for apartments and operated by gas, oil or electricity: also builders' hardware.

*8039. Birmingham, England. Axle tubes, automobile, welded or weldless, and spring pads and flanges.

*8089. Singapore, Straits Settlements. Electroplated coffee percolators, toasters, etc., nonelectric.

*8050. Montreal, Canada. Hardware such as knife sharpeners and graters.

*8072. Peterborough, Canada. Hardware specialties, furniture hardware and mechanic's tools.

*8055. Amsterdam, Netherlands. Locks, spring, for railway passenger cars.

*8071. Baghdad, Iraq. Stoves, oil-burning, heating and cooking.

*8056. Santiago, Chile. Tools and cutlery.

*8052. Nairobi, Kenya Colony, Africa. Tools, such as spades, shovels, picks and other implements for gold mining.

*Interested American firms and individuals may obtain the names and addresses of the foreign firms making these inquiries upon application to the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, or any district or cooperative office.

• MEETINGS •

AMERICAN ENGINEERING COUNCIL. Annual meeting, Jan. 10-12. Washington, D. C. FREDERICK M. FEIKER, executive secretary, 744 Jackson Place, N. W., Washington, D. C.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Winter convention, Jan. 22-25. Engineering Societies Bldg., New York. H. H. HENLINE, national secretary, 29 West 39th St., New York, N. Y.

AMERICAN MANAGEMENT ASSOCIATION. Personnel and industrial relations conference, Feb. 6-8. Hotel Schenley, Pittsburgh. Fifth packaging exposition and conference, March 5-8. Palmer House, Chicago. American Management Association, 20 Vesey St., New York, N. Y.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS. Annual meeting, Jan. 28-30. Buffalo, N. Y. A. V. HUTCHINSON, secretary, 51 Madison Ave., New York, N. Y.

SOCIETY OF AUTOMOTIVE ENGINEERS. Thirtieth anniversary dinner, Jan. 7. Hotel Commodore, New York. Annual meeting, Jan. 14-18. Book-Cadillac Hotel, Detroit. JOHN A. C. WARNER, secretary, 29 West 39th St., New York.

• PATENTS •

December 4, 1934

Metal-Working Machinery

Apparatus for Making a Tap. Franklin Judge, Greenfield, Mass., assigned to Greenfield Tap & Die Corp. Patent 1,982,736.

Scroll Cutting Machine. Frank Czemba, Duluth, Minn., assigned to American Steel & Wire Co. Patent 1,982,983.

Gear Cutting Machine and Method. Adolph L. De Leeuw, Plainfield, N. J. Patent 1,983,019.

Machine for Universally Milling, Grinding and Drilling Workpieces of all Kinds. Reinhard Kolsch, Pforzheim, Germany. Patent 1,983,090.

Tube Closing Machine With Sealing Rolls. Charles J. Westin, Philadelphia, Pa., assigned to F. J. Stokes Machine Company. Patent 1,983,505.

Tools and Attachments

Pneumatic Bumping Tool for Sheet Metal. Charles Hopkins, Detroit, Mich. Patent 1,982,667.

Apparatus for Removing Metal in a Threading Operation. Franklin Judge, Greenfield, Mass., assigned to Greenfield Tap & Die Corp. Patent 1,982,737.

Mechanism for Controlling the Movements of a Head or Carriage of a Machine Tool. Forrest E. Cardullo, Cincinnati, Ohio, assigned to the G. A. Gray Co. Patent 1,982,856.

Hopper Magazine Feed Device. Harry W. Rupple, Shaker Heights, Ohio, assigned to the Cleveland Automatic Machine Co. Patent 1,982,964.

Thread Cutting Tool. Albert J. Prance, Detroit, Mich., assigned to Murchey Machine & Tool Co. Patent 1,983,189.

Thread Cutting Tool. Albert J. Prance, Detroit, Mich., assigned to Murchey Machine & Tool Co. Patent 1,983,190.

Processes

Method of Making a Tap. Franklin Judge, Greenfield, Mass., assigned to Greenfield Tap & Die Corporation. Patent 1,982,738.

Method of Working Metal. Francis Mohler, Schenectady, N. Y., assigned to General Electric Company. Patent 1,983,387.

December 11, 1934

Metal-Working Machinery

Welding Device. Joseph Calley, Detroit, Mich., assigned to the Murray Corp. of America. Patent 1,983,692.

Method and Machine for Forming Channel-Shaped Articles. Howard F. Johnson, Cleveland, Ohio, assigned to the Champion Machine & Forging Co. Patent 1,984,020.

Tools and Attachments

Pipe Grooving Tool. Frederick H. Ruppel, Pasadena, Calif. Patent 1,983,922.

Swage. William Schmid, Bronson, Mich., assigned to Harry A. Douglas. Patent 1,984,234.

December 18, 1934

Metal-Working Machinery

Lapping Machine. Wilson P. Hunt, Moline, Ill., assigned to Hutto Engineering Co., Inc. Patent 1,984,374.

Apparatus for the Surface Finishing of Metal. Oscar F. Gottlieb and Ray A. Sandberg, Waukegan, Ill., assigned to Oakes Products Corp. Patent 1,984,528.

Shear Device. Thomas D. Williams, Garfield Heights, Ohio. Patent 1,984,717.

Die Machine. William V. Gerster, McDonald, Ohio. Patent 1,984,737.

Flying Shear. Florence C. Biggert, Jr., Crafton, Pa., assigned to United Engineering & Foundry Co. Patent 1,984,913.

Broaching Machine. Francis J. Lapointe, Ann Arbor, Mich. Patent 1,984,974.

Method of and Apparatus for Lapping Gears. Alfred C. Page, Detroit, Mich., assigned to Detroit Trust Co. Patent 1,985,213.

Processes

Method of Eliminating Eccentricity in the Rotation of Work Spindles for Machine Tools. Gunnar Wistrand, Schweinfurt, Germany, assigned to Aktiebolaget Svenska Kullagerfabriken, Gottenborg, Sweden. Patent 1,984,718.

December 25, 1934

Metal-Working Machinery

Milling Machine. Walter D. Archea, Norwood, Ohio, assigned to the Cincinnati Milling Machine Co. Patent 1,985,225.

Spring Forming Machine. William E. Wunderlich, Muncie, Ind. Patent 1,985,392.

Milling Machine. Edgar D. Vancil, Cincinnati, and Henry J. Dods, Montgomery, Ohio, assigned to the Cincinnati Milling Machine Co. Patent 1,985,434.

Machine Tool. Fred A. Parsons, Milwaukee, Wis., assigned to Kearney & Trecker Corp. Patent 1,985,688.

Milling Machine. Carl W. Weiss, Brooklyn, N. Y. Patent 1,985,753.

Filling Machine. Louis De Markus, Pittsburgh, Pa., assigned to McKenna Brass & Manufacturing Co., Inc. Patent 1,985,767.

Tools and Attachments

Drilling Apparatus. Morris C. Allen, Chicago, Ill., assigned to Sullivan Machinery Company. Patent 1,985,229.

Chuck. William J. Gorman, New Britain, Conn., assigned to the Fafnir Bearing Co. Patent 1,985,446.

Metal Working Device. Frank E. McCabe, Shaker Heights, Ohio, assigned to the Grabler Manufacturing Co. Patent 1,985,454.

Indexing Device. Henry H. Wolf, Cleveland, Ohio. Patent 1,985,477.

Processes

Method of Manufacturing Laminated Metal Bands. Franz Jordan, Berlin-Charlottenburg, Germany. Patent 1,985,783.

PUBLIC LIBRARY
DETROIT MICH.

American Machinist

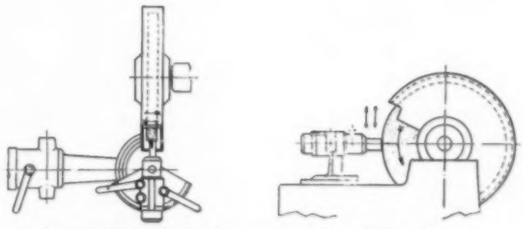
REFERENCE BOOK SHEET ©

Grinding Cemented-Carbide Tools

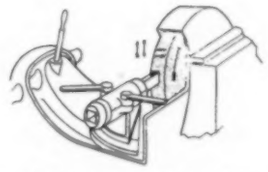
Single-Point Tools—II

Courtesy of The Carborundum Company

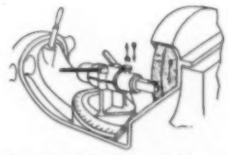
Machine Grinding on Tool Grinders



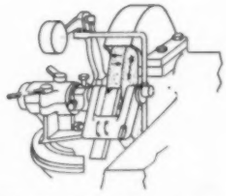
1. Set up tool in holder so that correct angles will be maintained.



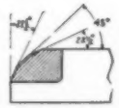
2. Bring tool to the wheel and grind nose by passing the tool up and down across wheel face, feeding wheel in slowly, and feeding the tool across the wheel face horizontally.



3. Repeat 1, 2 for sides and top.



4. Where radius (¼" and over) on nose must be ground, or where radius must be exactly smooth, use special forming attachment with suitable cam to develop correct shape.



5. For small radii (under ¼") grind 1 flat at 45° and 2 small flats at 22½° and 67½° by means of suitable adjustments of the tool holder.

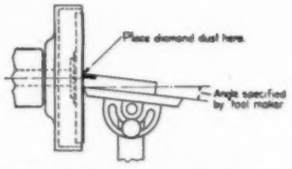
One type of tool grinder uses a plain wheel, as shown, and grinds on the periphery of the wheel. The plain wheel has the advantage that grinding is done by line contact, but will give a straight line from the heel to toe of the tool. The other machine employs a cup wheel, which has the advantage of constant peripheral speed of the wheel. General instructions are as follows: (1) Use light feeds; (2) Be sure that the work is flooded with water; (3) Large radii may be ground by the use of a special cam in the toolholder; and (4) In grinding curved-face tools have the cutting edge as close as possible to the cam.

Tools used for fine finishing cuts and those used on materials having a highly abrasive action should be lapped. By the use of the newly developed diamond wheel in the fine or extra-fine grits, the necessity for lapping is eliminated. Lapping can be done with two materials, diamond dust or silicon-carbide finishing compound. Machines for the lapping of cemented-carbide tools usually have a horizontal or a vertical disk directly connected to a motor and running at quite a high speed. The machines intended for the use of silicon-carbide compound should be speeded lower, 900 to 1,200 surface ft. per min. being recommended. Higher speeds cause the compound to fly off the disk, resulting in slow cutting. In many cases the disk speed for diamond lapping is also too high for efficient operation.

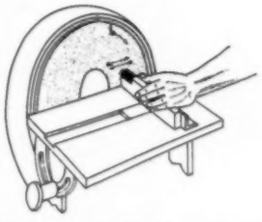
Set the table of the lapping machine ½ deg. less than the angle used for the grind. This will develop the cutting edge and make operation much faster than lapping the entire surface of the tool. General instructions are as follows: (1) Use diamond dust sparingly because the disk is impregnated and diamond dust is expensive; (2) Work should be examined frequently under at least a 10-power magnifying glass to determine the keenness of the cutting edge; (3) The direction of rotation of the disk should be against the cutting edge of the tool; (4) Lapping should be continued until all grinding marks are out.

The method of lapping with compound is the same as with diamond dust except that: (1) Enough compound should be used to form a film between the tool and the disk; (2) It is not necessary to impregnate the disk with abrasive.

Machine Lapping

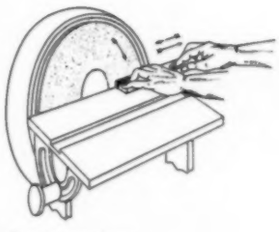


1. Adjust table to correct angle and place a small quantity of diamond dust and olive oil on the tool while it is in position against the rotating disc.



2. Lap nose by holding tool against disc, moving it across the disc.

3. Lap both sides as above.



4. Lap top as above.

PUBLIC LIBRARY
DETROIT MICH.

Long Leadscrews Made in Sections

M. M. McCALL

SOME LARGE lathes are of such huge dimensions that long lead screws are required, and to make them in one piece would require a lathe having exceptional capacity between centers. Besides, such long screws would be difficult to prepare for shipment and awkward to handle in the shop. It is the practice at the Niles Tool Works to make all lead screws over 60 ft. in length in two sections.

The details of one of the longest screws required, 113 ft., 11¾ in., are given in Fig. 1. After each section has been turned and threaded, the joint end is supported in a steadyrest and a hole for a coupling stud is bored and threaded in the end, as indicated at *A;* the details of the coupling stud are given at *B*. With the head section in the lathe, one end of the coupling stud is screwed tightly in place, bottoming in the hole. The tailstock is then removed from the lathe and the tail section of the screw is blocked up on the lathe bed in line with the head section and is clamped to the blocks. While the clamps prevent the tail section from revolving, it can be moved endwise by sliding the blocks to which it is clamped along the lathe bed.

A long nut is then screwed on the tail section, and the outer end of the coupling stud is screwed into that section by slowly revolving the lathe spindle. The tail section is thus drawn forward on the stud until the joint ends of both sections are in contact. Care is necessary to start the threads without crossing them, and to lubricate them well to offset friction caused in pulling the tail section onto the stud.

When the sections have been brought into contact, the threads, of course, will not match accurately, so the coupling stud is partly unscrewed from the tail section, leaving a gap, until the threads on both sections are in alignment and the nut placed on the tail section can be freely screwed from one section to the other across the gap. The gap is accurately measured and the coupling stud is entirely unscrewed from the tail section. Enough metal must be faced from the end of the head section to permit the threads to match when the two sections are screwed tightly together. The location of the threads in both sections is shown on the conventional sketch, Fig. 2, the dotted lines indicating how they match across the gap.

Assume that the width of the gap is 0.31 in. As the lead of the screw is 3

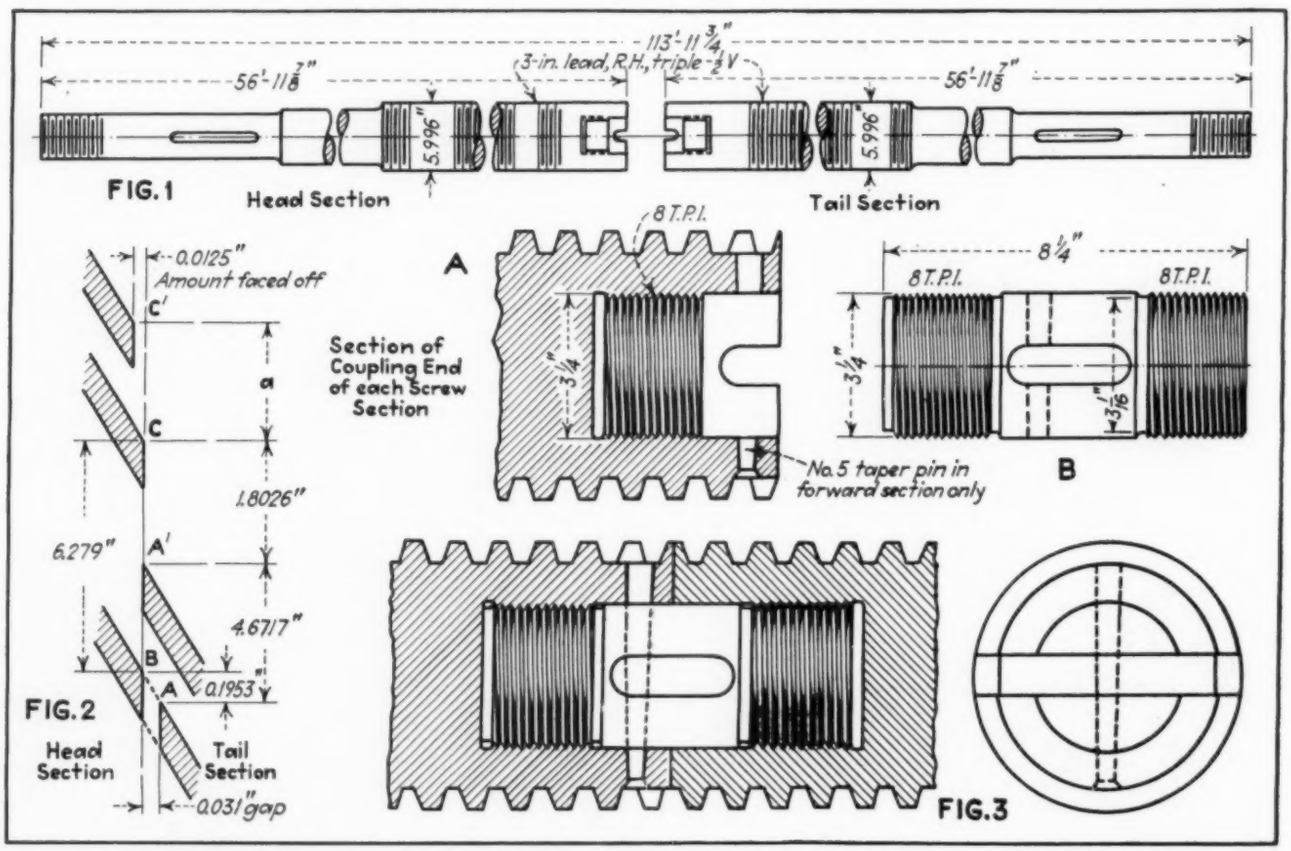


Fig. 1—Details of the sections of the screw. At *A* is shown the hole in one of the sections for the coupling stud; At *B*, the coupling stud. Fig. 2—Conventional sketch showing the steps necessary to match the threads when the joint ends of both sections are brought into contact. Fig. 3—The joint ends of the sections at final assembly. The coupling stud, the key and the taper pin are in place

in., a point on the edge of the thread and moved around the screw will move $\frac{1}{3{,}000}$ of the circumference for each 0.001 in. moved in the direction of the axis. This distance is found to be 0.0063 in., and the distance between points A and B, Fig. 4, will be $31 \times 0.0063 = 0.1953$ in. As the pitch of the threads on the coupling stud is 0.125 in., a point on the thread of the tail section will move a distance around the circumference equal to $\frac{1}{125}$ of the circumference for each 0.001 in. forward movement of the tail section on the coupling stud. This distance is found to be 0.1507 in., and if the tail section is screwed forward on the stud enough to close the gap, the point A will move $31 \times 0.1507 = 4.6717$ in. to position A'.

To match points A and B, it is necessary to face material from the joint end of the head section of the screw. For each 0.001 in. removed, point B will move a distance of 0.0063 in. around the circumference and point A will move 0.1507 in. for each 0.001 in. the tail section is screwed on the stud. This latter amount being the greater, it is obvious that if the threads of the screw were single, the tail section would have to rotate the greater part of a revolution before points A and B would match. But since the threads on the screw are triple, less movement will be necessary if point A is matched with point C on the second thread of the head section. Point C is 6.279 in. from point B, this distance being equal to one-third the circumference of the screw. It will be seen that point A in its position at A' is 1.8026 in. from C. To find how much metal must be faced from the joint end of the head section to permit points A and C to match: Let X equal the number of thousandths of an inch to be faced off of the joint end of the head section to match the threads when both sections are in contact; and let a equal the movement of point C around the circumference of the screw after X thousandths of an inch have been faced off.

Then

$$0.0063X = a \quad (1)$$

and

$$0.1507X = a + 1.8026 \quad (2)$$

Transposing (2)

$$0.1507X - 1.8026 = a \quad (3)$$

Placing values of a in Equations 1 and 3 equal to each other

$$0.1507X - 1.8026 = 0.0063X \quad (4)$$

Transposing (4)

$$0.1507X - 0.0063X = 1.8026 \quad (5)$$

Solving

$$X = 12.5 \text{ thousandths of an inch} \quad (6)$$

Therefore, 0.125 in. is the theoretical amount to be faced off the joint end of the head section to have the threads match when both sections are in contact. However, the veteran lathe operator who has made many of these sectional screws, has found by experience that this amount should be slightly decreased to compensate for the draw necessary to screw the sections tightly together.

After facing the joint end of the head section, the sharp edges on the sides of the end threads on both sections are filed slightly to remove any burrs that might injure the threads of the nut used on the screw. The sections are then screwed tightly together and the matching of the threads is noted by eye and tested by screwing the nut from one section to the other across the joint. After the joint has been approved, the assembled screw is taken to a cottering machine and an elongated hole is cottered through both sections and the coupling stud for a flat key. With the key in place, a hole is drilled and reamed for a taper pin to prevent the key from moving. When the screw has arrived at its destination and the sections have been joined in final assembly, the small end of the taper pin is headed over. The joints at final assembly are shown in Fig. 3 with all holding members in place.

Ethics in Tolerances—Discussion

ROBERT S. ALEXANDER

P. H. Bryant, in an article under the title given above (*AM*—Vol. 78, page 545), brought out the part played by ethics in the matter of ordering and supplying materials to specification. Undoubtedly the buyer is still actuated by a motive that is as old as business itself—to get as much as possible for as little as is possible. This accounts in a large measure for the practice of specifying unneccessarily close tolerances.

I know of an instance where micrometic precision in length of work was insisted on by a buyer of a quantity-lot of shafting. Yet this same buyer bawled out one of his men who used a vernier caliper in making two extra pieces—scale measurement was good enough. In this case, too, the idea of most for least was prominent, yet it seems to me that in like transactions there was another angle involved—a certain element of distrust of the other fellow's ability to produce according to specification, even though backed by a reputation for dependability. Notice, for example, how the average shopman scans a piece of work that has come in from the outside; how he subjects it to an inspection that would be considered ridiculous if the piece were made in his own shop. So it follows that this same human tendency to disparage the other fellow's ability naturally shows itself in the matter of making specifications.

Often this skepticism reacts in a certain manner against the buyer who makes out his specifications, an instance of which I recall. The piece involved was an aluminum die-casting having two holes that were to be tapped by the buyer. The buyer was a shop owner of the old school and refused to be sold on the idea that modern die-casting methods could produce castings having hole diameters that were correct in size for tapping.

The salesman did his best to convince the buyer that it was possible to obtain clean castings having holes of uniform size held to close limits. But the old fellow would have none of it and insisted that the holes be left small, leaving sufficient stock for reaming to tap-drill size. In due course, the castings were delivered, and along with them came the salesman who had tried so hard to convince the old man of modern die-casting accuracy; this time he succeeded. With a plug gage turned to the specified size of the holes, he allowed the buyer to select any of the castings at random and to gage the holes. The holes were found to be smooth and to vary but 0.001 in. over and under the specification.

Had this buyer been willing to accept the salesman's claims in the first instance, he would have saved the time and money spent in a needless reaming operation on hundreds of castings.

The part played by ethics in this transaction is not difficult to see. On the one hand, the castings concern, through its salesman, clearly demonstrated that it was out to help the customer and to live up to the letter of his specification. The customer, on the other hand, still living in the let-the-buyer-beware era, showed by his distrustful attitude what was apparent in his business life—a complete disregard for ethical considerations. If clear-cut business ethics were favored between buyer and seller, tolerances could be set without "safety" reservations on either side that make for closer limits than common sense dictates.

How Much System?

JOHN R. GODFREY

Old Man Johnson and his pal Bill Grimes were discussing the NRA and settling the fate of nations, as we all try to do at times.

"I'm all for the aims of NRA, Johnson. Business needs a lot of reforming. But I don't like to see the trend of government getting into business. Not so much on account of the competition as because it's so inefficient. You get so much red tape and it takes so long to get things done."

The Old Man chuckled. "Bill did you ever hear of the man who saw the mote in his neighbor's eye but not the beam in his own? Or was it that other way round? In any case you get me, I guess."

"But how does that fit the case? Are you by any chance hinting that my own business methods aren't so hot as I imagine?"

"Just that, Bill. And I had a darn good example of it the other day."

"Spill it, Johnson, but I'm betting you've got the wrong dope."

"Well let's start with your P.A., Bill. He's a nice chap but he has to hold his job. So he follows your system just as far as he can. You have a rule that no vender can contact your engineers but all information must go through the P.A. That's delay number one."

"But we can't have every peddler taking up our engineers' time."

"Who said anything about 'peddlers'? Many of the men who represent your suppliers are just as good engineers as any of yours. How can your P.A. get their ideas across to your engineers as well as the men who know all the details? We get some of our best ideas from hints or experiences of sales engineers."

"Well, what's number two? I'll think over that one awhile."

"Your inspection system, Bill. You have two—one for technical accuracy and the other for appearance. You call it 'quality' because it sounds flossier. Most of it is high-faluting bunk. Each of these inspects the parts you buy—gears, covers and what not. Each writes a report and sends a copy to both the P.A. and the engineering department."

"But that's our way of keeping track of things. Verbal orders don't go in our place."

"No, Bill. But time does. Then the engineers make out duplicate reports, send one to the P.A., and he places the order or rejects the bid."

"What's the matter with that?"

"Nothing but waste of time and cost, when it works—which doesn't often happen. Let me tell you what happened last month.

"We sent two sets of samples which never got to the engineering department at all. Lost in the shuffle. The P.A. complained about our delaying your work till we showed him our receipt, then he asked for other samples. Believe it or not, it took the third set of samples to reach the engineers. They asked to see our engineer and told him of snags that had developed. We had anticipated them and could have saved you a lot of time if we could have seen the engineer first."

Too Many Reports

"Anything else wrong in our plant?"

"Plenty, Bill. It took us two weeks to get a report on the samples, and your P.A. phoning every day that *we* were delaying the work. Then we got an O. K. and started work. During that week we got two other reports on the same job from the samples that were 'lost' in the plant. And the funny part is that one report praised the samples and the other rejected 'em. You've got system all right but I'd hate to have it in my own shop."

"Sounds kind of bad, I'll admit, Johnson. Seems to have slipped a cog somewhere."

"That isn't all, Bill. Before you do any more grouching about government inefficiency and the waste of bureaucracy, you better clean house yourself. I don't like waste any better than you do. That's why I'm not anxious to see the Johnson Motor Company grow any more than necessary. The bigger any institution the greater the waste of time, effort and especially the enthusiasm in getting the work done. Big plants are probably necessary in this day and age. But don't get the idea they are all efficient because they happen to be privately managed."

Too much system will strangle the best engineering department

Fixtures for Shoes and Wedges

PLANING still predominates as a method of machining shoes and wedges for locomotives although milling machines are being used in some of the larger shops. In either case fixtures or special chucks are used to hold the work. Where the shoes and wedges are machined in strings, as on either a planer or a planer-type miller, the fixtures are similar. If, however, a miller of the manufacturing type is used, it is customary to use air-clamping fixtures which, while holding but one or two pieces, enable them to be handled rapidly.

Two types of planing fixtures are shown: Fig. 1, for planing the outer, or flat side of the wedge, and Fig. 2 for the inner or channel side. In Fig. 1 the edges are supported on four cone-pointed screws that can be adjusted for height to suit different work. Double pointed, cone-end pins hold the work from each side as at *A*. Uprights which carry hollow head set-screws can be set at desired points and force the hardened pins into the work. Central supports such as at *B*, make it easy to center the work and to take care of end thrust by suitable clamps.

A somewhat different chuck, for planing the inside of wedge, is seen in Fig. 2. Here the work rests on top of the body *A*, the taper being secured by blocks as at *B*. Clamping is done by the serrated jaws with hardened teeth as at *C* and *D*. These jaws slide in double T-slot guides shown in the end view. The end jaws are forced against the work by 1¼ in. screws, holding two pieces at once against the long jaw in the center. When shoes are being planed, only the short jaws are used.

These chucks have been found useful by one large railroad, and were designed primarily for use on a crank planer. They could also be used for milling on almost any type of machine.

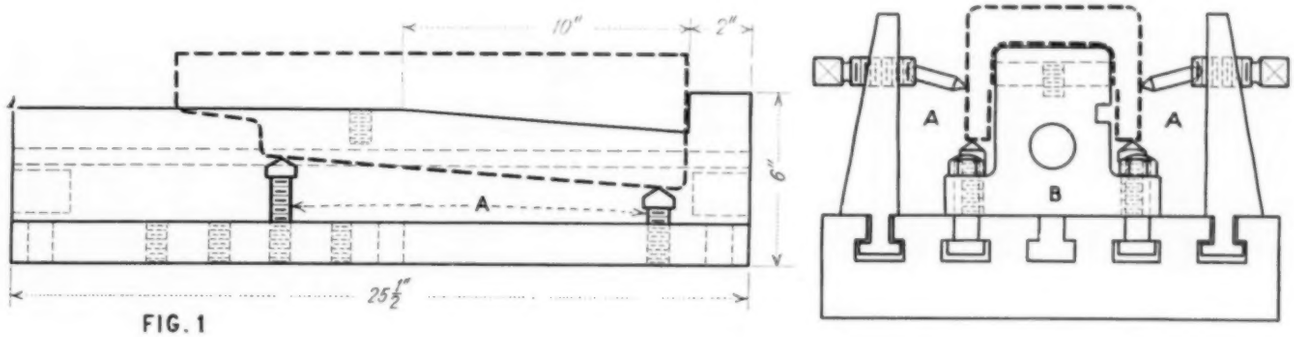


FIG. 1

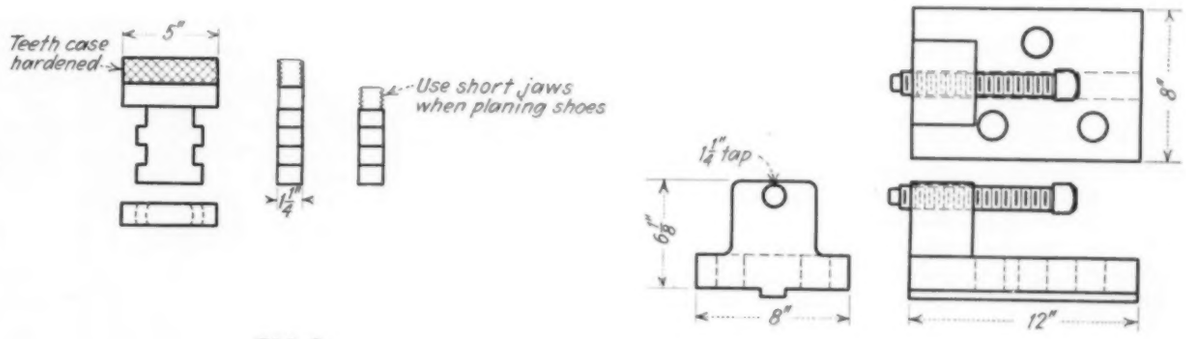


FIG. 2

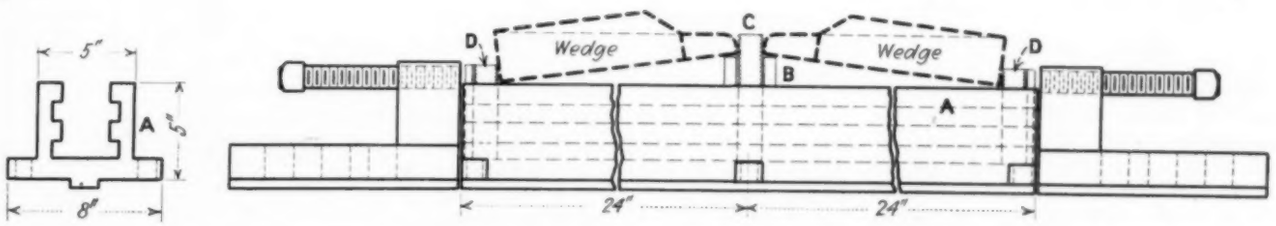


Fig. 1—This planer chuck will handle several sizes of driving-box wedges for outside planing. Fig. 2—Inside faces are machined with two wedges held between special gripping jaws that prevent slipping

IDEAS

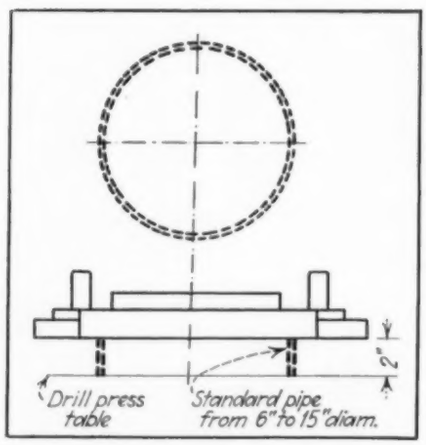
FROM • PRACTICAL • MEN

A Substitute for Parallels

H. J. SNOW

In drilling operations in our toolroom we have been experimenting with rings cut from pipe of large diameter instead of parallels on which to rest the work. The sketch shows the scheme.

In moving around work that is resting on parallels, there is always more or less danger that one of the parallels will be moved from under the work and possibly fall off of the drill-press table. This danger is obviated by the use of rings cut from pipe. Besides, the rings are much cheaper than are parallels.

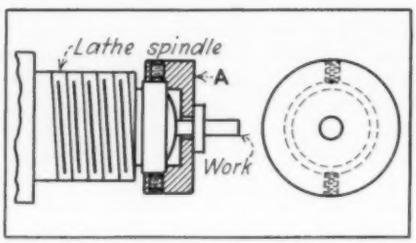


In drilling operations, rings cut from pipe of large diameter are being used instead of parallels on which to rest the work

Positive Stop for Work Held in Draw-In Collets

PETER L. BUDWITZ

In facing repetitive work held in draw-in collets and requiring accurate uniformity in shoulder thickness, the workman may tighten the collet on the work with different pressures at various times, or the work may vary slightly in diameter. In either case the collet will be drawn into different endwise locations, causing variations in shoulder thickness. This being the case, the stop on the lathe carriage is useless.



As the cap butts against the bushing and is entirely independent of the collet, it serves as an accurate shoulder stop for the work

The stop illustrated consists of the cap *A* bored to suit the work and counterbored to fit over the bushing that holds the collet. The shoulder in the counterbore butts against the end of the bushing and the cap is secured to the bushing by diametrically-opposite safety setscrews. No matter what endwise location the collet may take when it is tightened on the work, the endwise location of the face of the work will not be changed.

Templets for Isometric Projection of Circles Discussion

JOHN E. HYLER

Referring to the article by J. E. Moore under the title given above (*AM* —Vol. 78, page 607), templets made of paper leave much to be desired. If used much, the edges will soon break down and the templets will be worthless. Besides, paper templets are not transparent and are not easily superimposed on axial lines.

For occasional use, a templet cut from a discarded film negative (if it is not too dense) is better than one of paper, and the major axial line can be drawn upon it with waterproof drawing ink. The major axial line only need be drawn, because when the major axis is properly positioned on the drawing, and a templet is used, the minor axis comes right automatically.

Templets for ordinary detail sketches can be made from spectacle lenses by grinding them to the required shape. The projection of the circle can be drawn on paper, cut out and glued to the lens and the lens can be ground even with the edge of the paper. The major axial line can be lightly scratched on the lens with a diamond. The paper can be removed by soaking in warm water.

Templets for steady use can be made from heavy celluloid or from draftsmen's triangles that have been discarded for any reason, and the major axial lines can be drawn on them either with ink or with anhydrous acetic acid.

Saving Time in a French Railroad Shop

ALBERT KOENIGER
Chief of Locomotive Shops, Alsace and Lorraine R.R.

Both time and a lot of heavy work is saved by the use of the combined drill and "holder-on," or "old man" in the language of your country. Details of the device are shown in Fig. 1 where the tube *A*, about 2 in. in diameter and 3 ft. long, supports the drill and the holder-on. The support *B*, which holds the air drill, is built up with a tubular brace and a flat web, these being welded to the drill bushing, to the tube and to each other. The drill is also supported as at *C*.

The holder-on is also built up by

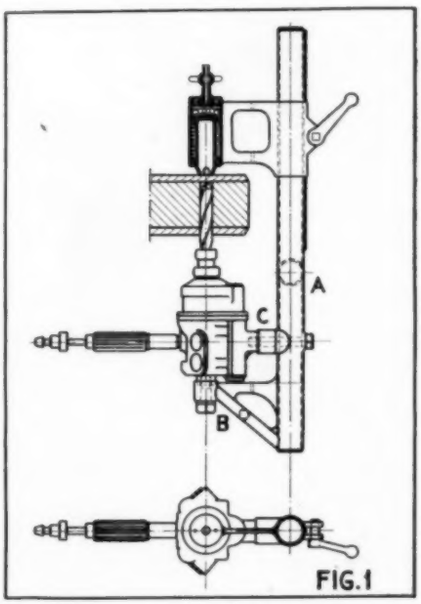


Fig. 1—Air drill and "old man" for use in railroad shop work

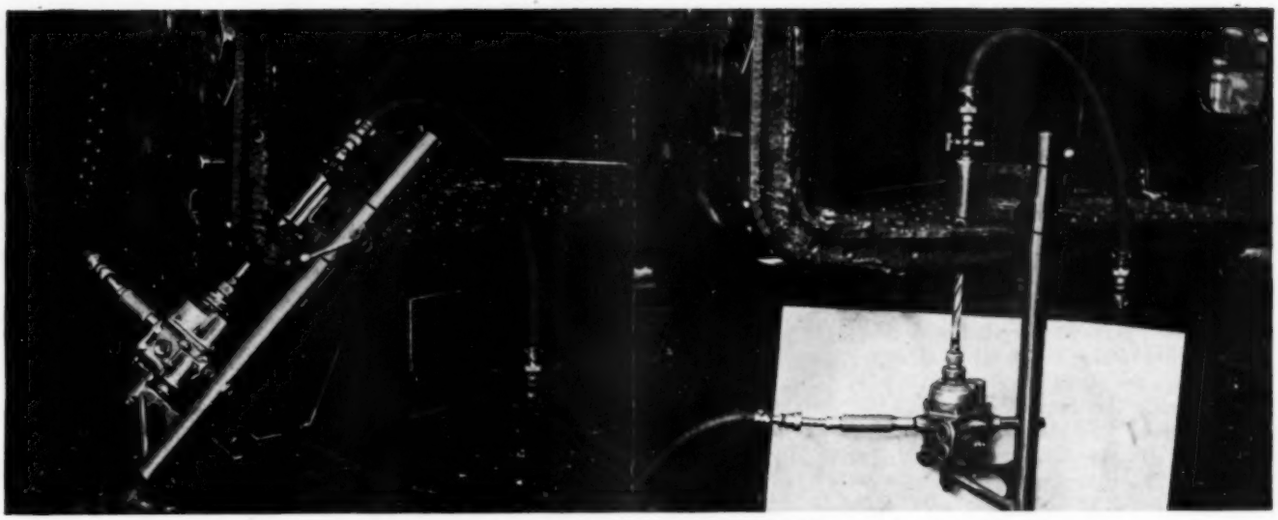


Fig. 2—Two applications of the combined air drill and holder-on show its advantages. The air cylinder holds the device in place and feeds it, no matter what the position

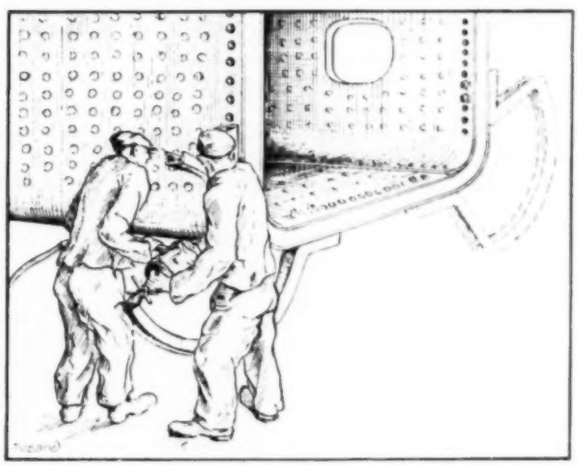


Fig. 3—Two men, plus a special channel-iron hold-back, were necessary before the combination tool was built. The saving by the new set-up can easily be estimated

welding, has a sliding support on the tube that can be clamped in any position, and carries an air cylinder and piston in line with the drill spindle. The air cylinder has a plug cock at the end for controlling the admission of air when desired. The helical spring outside the piston returns the piston when the air is allowed to escape from the cylinder. The piston has four prongs, that contact the back side of the work, being drilled and, being hollow, it allows the drill to break through without interference. The feed of the drill is controlled by the admission of air to the cylinder of the holder-on.

Two applications of this device in drilling holes in firebox sheets are seen in Fig. 2. These show that it is equally useful in the straight portions or on the corners. When putting new sheets on old frames, or mud-rings, it is customary to use the holes in the frame to guide the drill through the sheets.

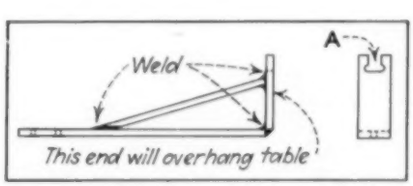
Some idea of the savings over the old method of drilling corner holes can be had by examining Fig. 3. It was formerly customary to use the curved channel irons as a support for the back end of the drill. These were bolted on as shown, and it took two men to handle the drill. It was more difficult to locate than with the new device and the hand feed was less satisfactory in every way. The new method has paid for itself many times.

Aligning the Ends of Long Work—Discussion

O. D. BRADSHAW
Fredericton, New Brunswick, Canada

In an article under the title given above (*AM*—Vol. 78, page 681), J. E. Moore describes a method of aligning the ends of long work in the milling machine. While his method is quite effective in securing results, I think considerable time is wasted in setting up the work, as six screws are used in each block and one end of the work is squared up. Then the whole assembly is transferred to the milling machine.

I think the following method would be quite as effective, no set-up time being required: Make a fixture as shown in the illustration, by welding or other means. Mount it on the machine and mill the slot *A* to the finished size of the flattened end of the work. Bore and square a block to fit the tube and cut it in half lengthwise. Then put these two halves in the vise, clamp the tube between them and mill the flat on



The slot in the vertical member of the fixture is used to hold the work, as well as to gage it

one end. Now set the vise as far to the end of the table as possible and mount the fixture on the other end and line it up with the vise. Then turn the tube end for end, rest the finished end in the fixture slot, clamp the other end in the blocks in the vise and machine it.

Besides holding the finished end of the work, the slot in the fixture acts as a gage. If the tubes are not too long and the finished ends are a good fit in the slot in the fixture, the job would be within the required limits. If the work would pass through the spindle of the dividing head, the head could be used in place of the vise by using a universal chuck.

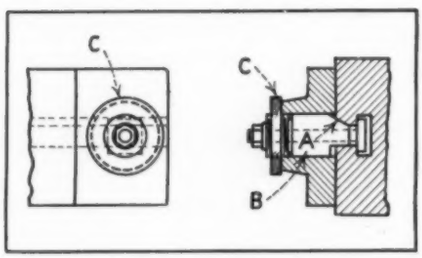
Self-Aligning Fixtures

FRANK HARTLEY

When several fixtures for machining like parts are mounted in tandem on the machine table, they can be automatically brought into alignment by the construction shown in the illustration.

The T-slot in the table is beveled as at *A*, and bushings *B* are provided instead of the usual tongues on both ends of the fixtures. At one side of the lower ends, the bushings are beveled to fit the beveled side of the T-slot, while the opposite sides are straight.

In aligning the fixtures on the table, the nuts on the clamping bolts are tightened slightly, forcing the bushings downward so that the wedging action



Instead of the usual tongues, bushings beveled on one side are forced into contact with the beveled side of the T-slot, thus aligning the fixtures

brings their straight sides against the straight side of the T-slot. After the fixtures have been aligned the collar nuts *C* are screwed down by hand into contact with the fixtures and the nuts on the clamping bolts are firmly tightened. The object of the collar nuts is to prevent the bushings from being forced down hard enough to injure either them or the T-slot.

Hollow Mills in Railroad Work

CHARLES F. HENRY

Hollow mills have a real field of usefulness in the railroad shop. Two such jobs are seen herewith. The first, Fig. 1, is a link cheek for a Walschaert valve gear. When worn, the pins are built up by welding a hard bronze surface over the worn places. The hollow mill finishes the pin diameter and faces the shoulder. The work is done on a radial drill.

Details of the hollow mill are seen in the tool on the table. The six inserted cutters are held in position by taper pins which expand the slotted portion of the body into contact with the cutter

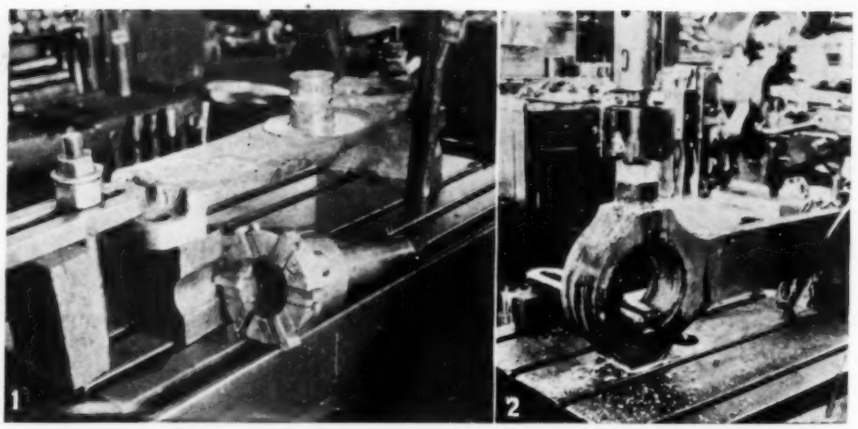


Fig. 1—Hollow mill which is used on the link cheek of a Walschaert valve gear. Fig. 2—Finishing the outside of a grease cup on a side rod

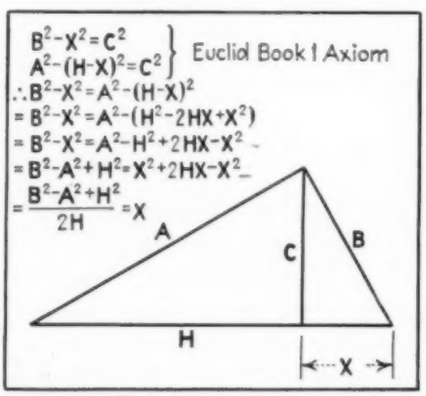
blades. This method avoids any indentations in the cutter and reduces the likelihood of cracking in hardening and in use.

The second job is finishing the outside of the grease-cups on the ends of side rods as in Fig. 2. The same type of hollow mill is used and on the same kind of a machine. The flattened underside of the rod makes it easy to clamp the rod on the drilling machine table.

A Problem in Laying Out Discussion

JAMES PEARMAN
London, England

In an article under the title given above (*AM*—Vol. 78, page 453), Harold E. Murphey sets out to give a graphic solution of how to get the vertical height and also the distance from one end to where the vertical line divides the two right-angle triangles. I have read this article very carefully and I cannot discern any method given to accomplish this. Mr.



The problem is simple and can easily be solved by the formulas given by any one who has had an elementary-school education

Murphey says it can be done by simple arithmetic, but he does not show how. Also he does not tell how he gets his four-place decimals by ordinary measurement.

However, if the problem is fully understood it soon loses its terrors. It will be seen by the accompanying sketch that in an oblique triangle with sides *A*, *B*, and *H* known, but with no angles given, the reasoning is very simple and direct. If this is too difficult to follow step by step, the final formula

$$X = \frac{B^2 - A^2 + H^2}{2H}$$

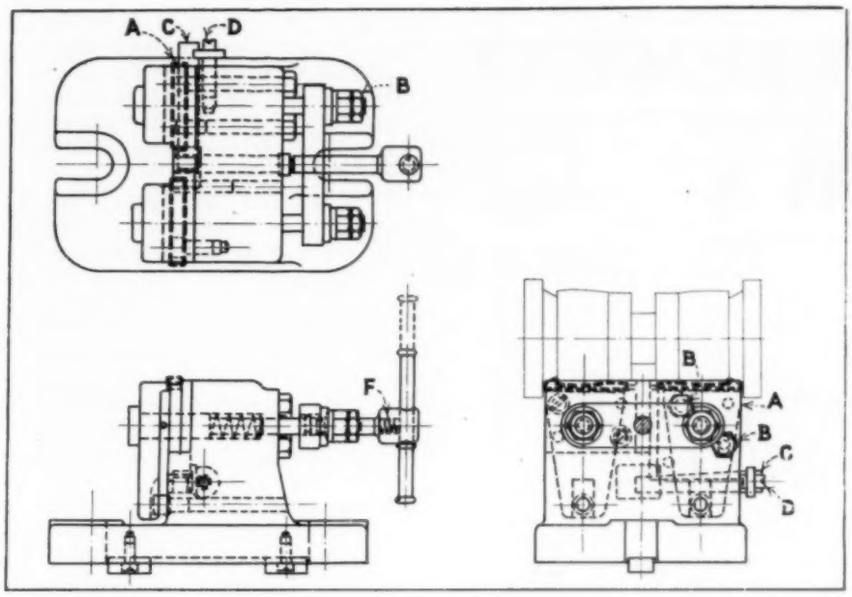
is very easy to work out by simple arithmetic, especially if the three known sides are in eighths or sixteenths of an inch. The squares can be found in any engineer's handbook. When this has been worked out and *X* has been found, the height can be gotten by the theorem of Pythagoras (Euclid, Book 1, Problem 47), thus: $\sqrt{B^2 - X^2}$.

It will be seen that both of these formulas can be used by any one who has had an elementary-school education, as they do not involve anything higher than multiplication, addition, subtraction and extracting square root, which should be within the capacity of any intelligent toolmaker.

Adjustable Milling Fixture

H. C. SEEGERS

In milling duplicate pieces that are held in fixtures placed side by side, as shown in the illustration, to keep the pieces of equal thickness, either both cutters must be of the same diameter or one of the fixtures must be adjustable for height. Since it is almost impossible to sharpen the cutters so they will both be of the same diameter, the fixture *A* is made adjustable for height.



In the double fixture illustrated, one part is adjustable to keep both pieces of work of the same thickness, irrespective of the difference in the diameter of the cutters

Where any difference in the diameter of the cutters produces pieces of unequal thickness, locking bolts *B* are loosened and adjustment is made by operating the wedge *C* by the collar screw *D*. After adjustment has been made, the locking screws must, of course, be tightened.

The leverage of the clamping screws can be increased by sliding the levers in their holes in the screws, the same as in a bench vise, springs at *F* holding them in position.

SEEN and HEARD

JOHN R. GODFREY

Giant Upsetter

What is believed to be England's largest horizontal forging and upsetting machine has just been completed by the Coventry Machine Tool Works, Ltd., according to *Industrial Britain*. Weighing 50 tons and taking four months to complete, this machine is capable of producing rings or ball races at the rate of 100 per hour.

90,000 Miles Non-Stop

Time was, and not so long ago, when the engine in an airplane was both temperamental and tender. A few hours running meant at least a "top-overhaul" and 50 hours was the signal for a complete overhauling. A recent test of a geared Hornet engine shows the advances we have made. After running 155 hr. for calibration of various kinds it was put on an endurance test of 500 consecutive hours at 490 hp. and at a speed of 1,980 to 2,000 r.p.m. Dropping out all but the 500-hr. run and calling it 2,000 r.p.m. for easy figuring, we have 60,000,000 spins without a stop. At 180 m.p.h., which is not high for such an engine, it could have driven a plane 90,000 miles or 900 miles a day for 100 days.

An automobile engine that could run 90,000 miles without any repairs, not even a valve ground or carbon removed, would be something to shout about. Of course the difference in conditions makes fair comparisons difficult, but the aircraft engine builders deserve a medal for their achievements. And it might be well not to overlook the 3:2 gear reduction that drove a 3-bladed propeller that was 11 ft. 6 in. in diameter all through the test.

Juggling Commission Figures

Juggling figures seems to be a favorite pastime of many officials who set prices on equipment. Buyers frequently order machines without motors because they feel that they can save money by buying and attaching them in their own shop. On the other hand salesmen are sometimes penalized in a motor deal without much apparent reason. Here is a case that came to view recently. The salesman was instructed to allow the buyer $425 if the machine was shipped without the motor. But in calculating the salesman's commission the motor was listed at $531, thus deducting $106 extra from the figure on which the commission was calculated. Such juggling can hardly be said to increase confidence in managerial ability, or loyalty on the basis of fair treatment. The Code of Ethics should be stretched a bit to cover everyone concerned.

The Easy Mark!

Advice, according to many, is the cheapest thing in the world. This, however, refers to engineers and those in similar occupations, not the lawyer or the doctor. The reason for the exception is not always clear. Recently a friend who is a mining engineer was consulted by another friend. His knowledge, plus two hours of valuable time, saved a direct expenditure of several hundred dollars and probable loss of thousands a little later. Yet a bill for $50 brought protest and recrimination. A similar bill from his lawyer or doctor would have been paid as a matter of course. Will the engineer always be this kind of an easy mark?

Welded Machine Construction

If anyone thinks that welded construction for machinery is a passing fad that can be lightly dismissed, he's missed his guess. One evidence of this is that progressive steel companies are rolling, and advertising, shapes especially adapted for building up machines of various kinds. Some of the examples of welded machine frames or bases are very attractive. Others are anything but. Combinations of shapes, plates and castings have great possibilities. Of course some will go to extremes but it is frequently necessary to find out what should not be done. Common sense plays its important part here as elsewhere.

Sturdy Radio-Type Tubes

Electronics, which so far as it concerns the shop is the application of radio tubes of one kind or another to shop uses, has been handicapped by the frail construction of the tubes. Now this is all changed. Instead of the delicate and unprotected glass tubes with numerous prongs of different sizes projecting from the base, a different breed of apparatus is available. No glass is visible and the metal cover is strapped and bolted firmly to the panel board. Heavy, flexible leads carry the current in and out and these leads have heavy lugs that can be screwed tight into place. At last the electronic tube is being built like a piece of industrial apparatus.

SHOP EQUIPMENT NEWS

Gridley Model "R" Six-Spindle Automatic Screw Machines

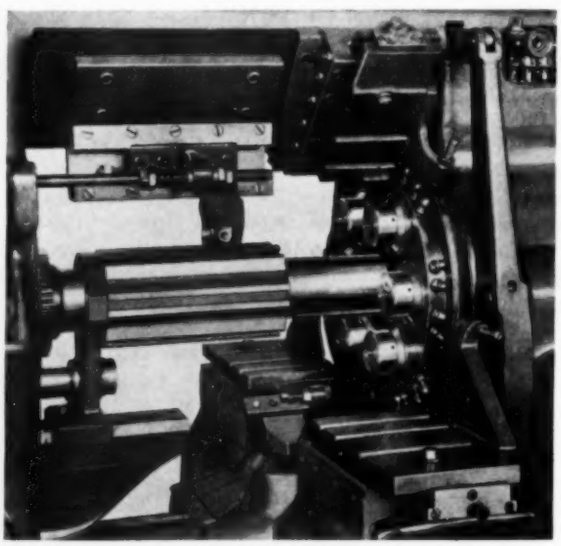
To meet the need for frequent changes of design in product, standardized machines, which are flexible in their uses, are required. To meet this need the National Acme Company, Cleveland, Ohio, is introducing a line of six-spindle automatics, to be known as the Model "R". These machines will supplement the line of four-spindle automatic screw machines (*AM*—Vol. 78, page 358).

The six-spindle and four-spindle Model "R" machines are built on the same frames, and are uniform in design so that an operator can run machines of different sizes, four or six spindle, in one group without confusion. So far as possible, machine parts, tooling and attachments have been made interchangeable to reduce the investment required. Furthermore collets and pushers for corresponding sizes of machines are interchangeable. The six-spindle machines are built in four capacities: $\frac{7}{8}$, 1, $1\frac{1}{4}$ and $1\frac{5}{8}$ in.

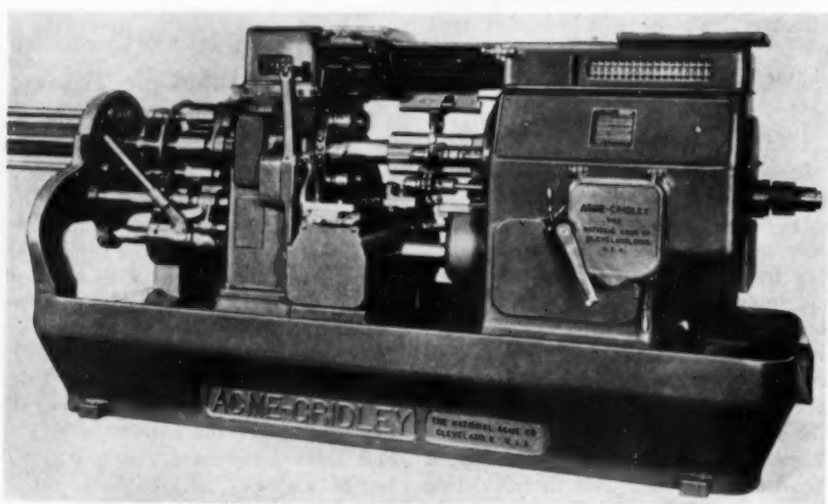
A feature in the design of the six-spindle Model "R" is the arrangement or spacing of the spindles in the spindle carrier. The two spindles at the top and the two at the bottom are in line for direct application of tooling from the four independently operated cross-slides. The two spindles at the sides (2nd and 5th positions) are accessible for a "short-coupled" double-deck toolholder or an independent cross-slide.

These machines are regularly provided with a stock stop in the sixth position, but can be furnished with the stock stop in first position. The stop is brought into position by mechanism that is entirely enclosed. It drops quickly out of the way after stock feeds out and the collet closes, making possible the use of tooling in the feed position. This makes all six positions working positions, and in combination with the four independent cross-slides, makes this six-spindle machine the equivalent of machines with a greater number of spindles.

The front disk of the stock reel turns in a reel guide which is mounted directly on the end of the frame and pan. The stock reel is indexed by power through shaft and gear from the spindle-carrier mechanism. This eliminates whipping action to the spindle carrier. The stock tubes are mounted in anti-friction bearings and revolve with the bar stock.



In the Gridley Model "R" Automatics the method of spindle spacing gives ample tooling space and each tool is readily accessible



Gridley Model "R" 1¼-in. Six-Spindle Automatic Screw Machine

An improved design of finger holder, which operates the opening and closing of the collets, is also furnished with these machines. The fingers themselves slide on a hardened cam inside the outer steel shell. Both the fingers and the shell rotate with the spindle so that excessive wear on the fingers is eliminated. Centrifugal force does not affect the action of the fingers because they are enclosed within the steel shell. This is also a safety feature

because of the smooth exterior of the chuck-finger mechanism.

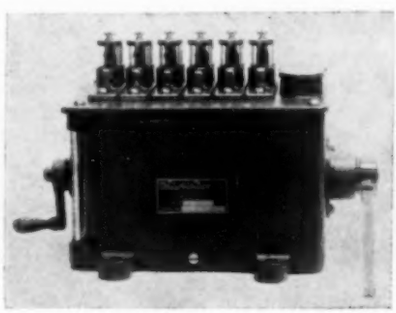
The spindle carrier has large bearing surfaces, and has a three-point support. The unusual length over the spindle bearings affords greater rigidity under heavy forming cuts, and eliminates vibration due to whipping of bar stock.

To employ forming tools and drills at the correct relative surface speeds for each tool, high-speed drilling attachments can be used in any or in all six positions, driven directly from the center gear mounted on the end of the spindle carrier stem. Threading is done in the third or fourth positions, or both, in all sizes of machines, and the same slide and operating mechanism, in either position, can be used for accelerated reaming or turning operations. These two die-slides are independent of the main tool-slide and of each other, because they are each operated by a separate cam. The same lubricating system is used on the six-spindle machine as on the four-spindle. There is a separate sight-feed oiler to each oil tube. The oiler automatically starts when machine is started.

Hills-McCanna Model "ET" Force-Feed Lubricators

The Model "ET" force-feed lubricators made by Hills-McCanna Co., 2349-59 Nelson St., Chicago, Ill., are produced in two types. The type "SF" has a positive-drip sight feed built in on the discharge side, and is intended for service where the delivery is to be checked at the pump. Type "BF" is built without a built-in sight feed. These pumps are intended to be used where delivery is to be checked in the delivery line or at the point requiring lubrication.

The Type "BF" is the same as the "SF" with the exception of the built-in sight feed. A single plunger is employed to take the oil from the reservoir, measure, and force it to the delivery point. The plunger is actuated by a rocker arm traveling on an eccentric. The oil is drawn in on the down stroke and delivered on the up stroke. Oil feed regulation is accomplished by changing the length of the plunger stroke. Adjustment from one to ten drops at each stroke against varying pressures up to 2,000 lb. per sq.in. is possible. Driving power is obtained from a clutch driving and holding rollers. Model ET lubricators are available in the following sizes: 2 pints, 1 feed; 4 pints, 1 to 3 feeds; 8 pints, 1 to 6 feeds.

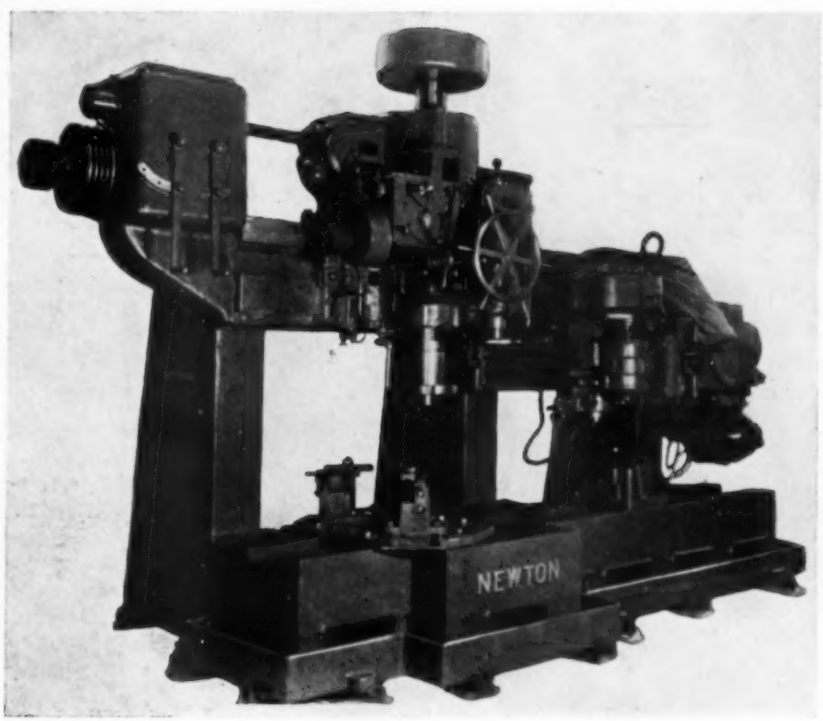


Udylite Rheostat for Electroplating Processes

Close current regulation, sturdiness, compact construction and simplicity of operation are features of the rheostat developed for electroplating processes by The Udylite Co., Detroit, Mich. The switches are of the self-cleaning, constant-pressure, cam type, and provide good contact at low plating voltages. The switch when open cannot make an accidental sparking contact because of the steel spring which holds it away from the bus bar. Resistors are of Nichrome wire. Coil brackets have a large radiating surface. Cooling of the resistors is accomplished by a chimney draft action. All contact surfaces of the rheostat are Udylited to ensure positive transmission of current. Other metal parts are likewise Udylited to prevent electrolytic corrosion. The ammeter and voltmeter are in full view of the operator. A double-throw, single-pole voltmeter switch is mounted on the rheostat to permit reading the voltage drop across the tank and across the line.

Newton Special Combination Boring and Milling Machine

A special combination boring and milling machine has been built by the Consolidated Machine Tool Corporation of America, Rochester, N. Y., for boring and milling the large and small openings in large connecting rods and similar work. The connecting rod is placed in a horizontal position on the work table to bore and face the large end of the rod with the large boring head. An adjustable unit milling head on the right side is used for milling the rectangular opening in the small



end of the rod. Power feed and quick return are provided for the boring head. Drive for the boring spindle is by a motor through a change-speed gearbox.

The milling head is of the unit-drive type, and the motor is mounted directly on the head. This head is mounted on an arm to provide in and out feed at right angles to the cross-rail. It also has lateral feed travel. A coolant pump and a centralized oiling system are provided.

Foley Die-Making Machine

The die-making machine placed on the market by The Foley Manufacturing Co., Inc., 11-15 Main St., N.E., Minneapolis, Minn., can be used on a large variety of work besides the usual die sawing and filing. Known as Model DM-1, this machine will take any type or size of saw or file. A positive, non-slipping saw feed mechanism is easily removed, leaving the table clear for filing. Rollers on each side and back of the saw support and guide the saw. Four speeds are provided by four step pulleys, 95, 135, 185 and 400 r.p.m. The ram can be tilted right or left to 20 deg. This movement combined with an adjustable table permits cutting at any combination of angles. An air blast keeps the work clean. A ¼-hp. motor is mounted on a pivot to insure proper belt tension. The machine will saw to the center of a 13-in. piece, and will saw and file steel 3 in. thick. Machine weight is 322 lb.

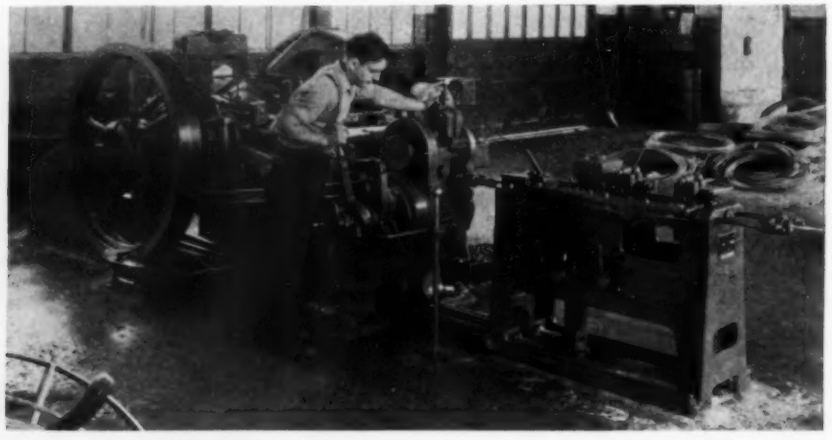
Hogue Wire Drawers

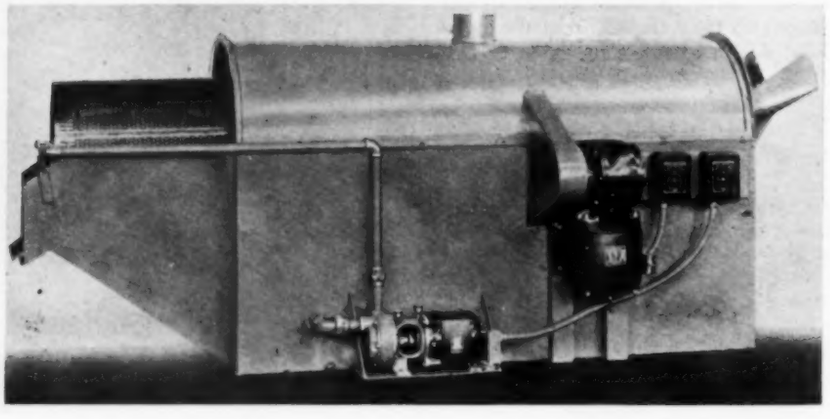
The Hogue wire drawer, built by the Ajax Manufacturing Co., Euclid Branch P. O., Cleveland, Ohio, is an attachment for cold heading machines to cold draw and coat hot-rolled, pickled and limed rod as it feeds into the machine. The stock is fed intermittently into the machine. During the periods between feeds it is held securely by grips adjacent to the feed rolls, and a drawing die is pushed back along the rod a distance equal to the amount fed. When the feed occurs the grips release and the drawing die and slide move forward with the rod, to be pushed back again during the next stationary period.

The slide which carries the drawing die is box-shaped at the top, and is filled with powder lubricant, which coats the stock for cold-heading and extruding operations. Motion to the drawing-die slide is imparted by a vertical lever fulcrumed in the drawer frame beneath the slide. The lever in turn derives its motion through a long horizontal connecting rod driven from an adjustable crankpin at the back of the heading machine. This pin is on the end of a crankshaft mounted in an independent housing, and is driven by chain from the crankshaft of the header. The standard sizes are No. 0, 1, 2, 3 and 4 for drawing ¼ to ⅞ in. diameter rod.

Ransohoff Continuous Washer for Metal Parts

A continuous washer for metal parts that subjects the work to a soaking and spray wash and transfers it from one drum to another without dropping it is announced by N. Ransohoff, Inc., Cincinnati, Ohio. In the first drum the work is submerged in a hot cleaning compound that facilitates drying later and is eased along by a welded worm. The dirt is completely loosened. The work passes through a head into a perforated compartment where a hot spray removes loosened dirt and chips. The last section is a draining drum from which the work emerges to dry



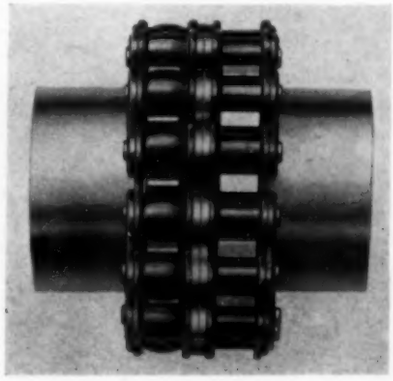


of its own heat. Fresh compound is pumped from a tank below. A skimming dam in the tank removes scum. A chip pan and removable screen chip basket effectively remove the chips.

The unit is completely self-contained. Driving motor and pump are attached to the side. A tight hood prevents escape of vapor to the room. Drum and worm construction prevents the work from sticking.

Baldwin-Duckworth Flexible Chain Coupling

The flexible chain coupling illustrated has been designed by the Baldwin-Duckworth Chain Corp., Springfield, Mass., to provide for flexibility without friction and excessive noise. This is accomplished by the use of special double-width roller chains. One strand of the chain is equipped with the standard cylindrical rollers, whereas the other strand has convex-surface, oversize rollers which provide for free operation where shaft deflection and misalignment exist. Permanent shaft deflections up to 3 deg. can be handled without undue strains.

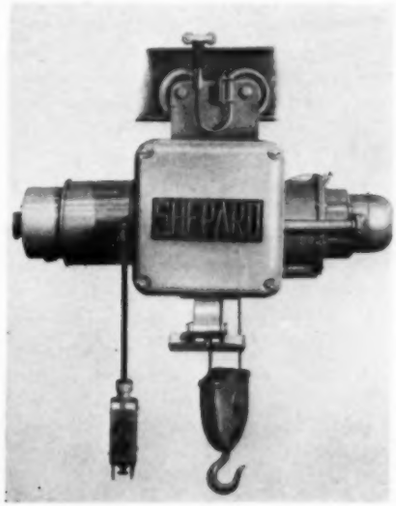


Brown & Sharpe Clamp Attachment

A clamp attachment No. 734A for use with dial test indicators Nos. 730 and 733 has been developed by the Brown & Sharpe Mfg. Co., Providence, R. I. This clamp has a maximum capacity of 2¾ in. in diameter and is quickly attached to arbor, spindle or similar machine part. It can be used with the indicator to check squareness of the spindle in the drill press and for similar work. The brass shoe on the end of the bolt swivels to prevent injury to a finished surface.

Shepard 5-Speed Control for Cranes and Hoists

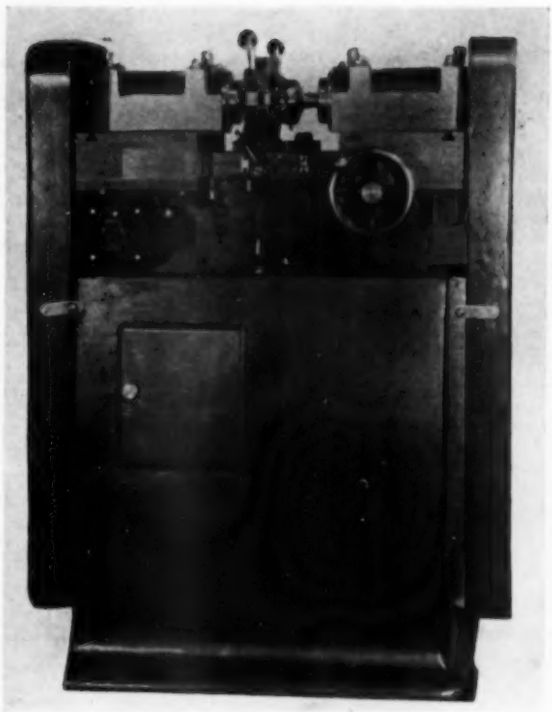
The Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., is marketing a selective 5-speed pushbutton controller in which the five speeds are controlled from one button. The operator, increasing the pressure of his thumb, feels the change as each of the five independent speeds are obtained when the button is pressed or released. The first speed is a creeping speed, and each of the succeeding four speeds gives a gradual increase in torque. By releasing the button gradually the motor is slowed down through the same graduated speeds to a stop. All five speeds are usually obtainable for lowering, regardless of the load. In hoisting, however, the load being lifted determines the number of speeds available. Thus, full loads will not move upward until the pushbutton is pressed to the third or fourth point. The controller is built in two sizes, Class 1 and Class A, rated at 3 hp. and 7½ hp., respectively.



Simplex Double-Spindle Precision Boring Machine

The Stokerunit Corp., 5325 West Rogers St., Milwaukee, Wis., recently developed a precision boring machine having two opposed spindles. The machine has a bridge at both ends so that the boring of holes can be done when the center-to-center distance is too small to permit the use of two heads on the same bridge. With the machine illustrated the fixture is capable of taking a gear pump cover and two different sizes of pump housings, although different tools must be provided.

Three motors drive this machine. A

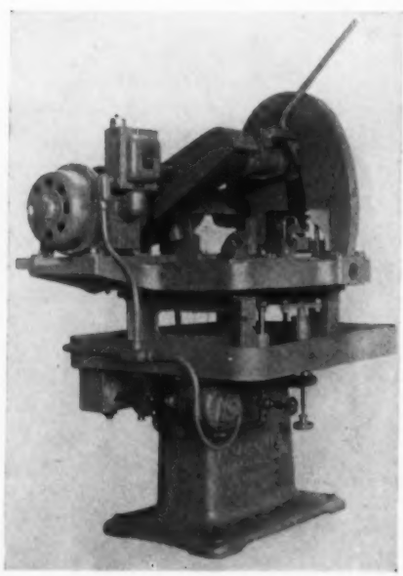


By the use of opposed spindles, holes can be bored that are too close together for boring by two spindles on the same bridge. The fixture can take three different parts. The machine is semi-automatic in operation

separate motor is used for each spindle and there is a reversible motor for actuating the table. Operating cycle is as follows: After loading the fixture and advancing it to the cutting position relative to the left-hand spindle head by means of the handwheel, the proper spindle motor is automatically selected as well as the proper table feed direction. When the operator pushes a pushbutton and engages the feed lever, the machine goes through a boring cycle and comes to a stop. Next, the table is traversed to the second head and the other spindle motor and opposite feed are automatically selected. Then, when the second pushbutton is pressed, the other hole is bored.

Campbell Wet Abrasive Cutting-Off Machine

The Andrew C. Campbell Division of the American Chain Company, Inc., Bridgeport, Conn., is offering an abrasive cut-off machine in which coolant is supplied to the disk. This disk, by its speed, collects the proper amount of coolant and directs it against and into the cut. Continuous and uniform quantities of liquid are taken up, resulting in equal wear on both sides of the disk, longer disk life and improved finish. Such materials as alloy steels, non-ferrous alloys, plastics up to 3 in. in diameter or tubing up to 3½ in. in diameter can be cut off. Model No. 202 has the work clamp operated by a treadle, whereas Model No. 203 has an automatic electrically operated clamp. Both machines are mounted on pedestal bases.



• TRADE • PUBLICATIONS

BRASS AND BERYLLIUM COPPER. The American Brass Co., Waterbury, Conn., has published two booklets in which are discussed two alloy products. Publication B-14 deals with brass rods for screw-machine products. Comparative cost figures are given on brass and steel products. Beryllium copper is discussed as a heat-treatable copper alloy in Publication B-21.

CRANES. The Canton Foundry & Machine Co., Canton, Ohio, has issued a booklet describing portable floor cranes. Dimensions and prices are given for eight sizes.

COMPRESSORS. The Pennsylvania Pump & Compressor Co., Easton, Pa., presents its class 3AT air-cushion-valve compressors in a Bulletin No. 157. Cross-section views show clearly details of construction.

DIE-SINKING MACHINE. The Pratt & Whitney Co., Hartford, Conn., has issued a circular describing the Keller automatic toolroom machine, Type BL. It explains the operation and use of this machine in detail. Specifications are included.

DRAWN STEELS. Machinability, strength and other physical properties of cold-drawn steel are discussed in a pamphlet by the Union Cold Drawn Steel Co., Massillon, Ohio.

FURNACES. The Bellevue Industrial Furnace Co., Detroit, Mich., in bulletin No. 10-T presents a series of gas-fired furnaces for general toolroom work.

HAND MILLING MACHINE. W. H. Nichols, Waltham, Mass., has issued a folder containing specifications of the "Whitney" 1935 hand milling machine.

MACHINERY AND EQUIPMENT. The Industrial Plants Corp., Toledo, Ohio, has been ordered to sell the entire machinery and equipment of the Willys Morrow Co., Elmira, N. Y., and excess machinery and equipment of the Willys Overland Co., Toledo, Ohio and of the Wilson Foundry & Machine Co., Pontiac, Mich. They have published an illustrated booklet listing the approximately 10,000 machines for sale.

MOTORS. The Louis Allis Co., Milwaukee, Wis., has prepared a motor price wheel. It consists of two fibre disks about 8 in. in diameter, which quickly tells the frame sizes and list prices of 448 sizes of squirrel-cage and wound-motor motors.

MOTORS. Electric governor - controlled motors are discussed in Section 2040 issued by the Bodine Electric Co., Chicago, Ill.

MOTOR MAINTENANCE HINTS. The Ohio Carbon Co., 12508 Berea Rd., Cleveland, Ohio, has prepared a 64-page booklet, "The Brush Phase of Motor Maintenance." The booklet deals in practical terms with the causes and effects of sparking and excessive wear of brushes, commutators and slip-rings of d.c. and a.c. motors and generators.

NICKEL AND CHROMIUM PLATING. "Protective Value of Nickel and Chromium Plating on Steel" is the title of Research Paper RP 712 published by the National Bureau of Standards. It explains exposure tests that have been made, including results and conclusions. For sale by the Superintendent of Documents, Washington, D. C., for five cents.

PROPERTIES OF GRAY CAST IRON. Research Paper RP 726 issued by the National Bureau of Standards, entitled "Properties of Gray Cast Iron As Affected by Casting Conditions," lists the compositions and traverse properties of test bars of different diameters. For sale by the Superintendent of Documents, Washington, D. C., for five cents.

ROOFS. "What About Your Roofs?" is the title of a recent publication by Johns-Manville, 22 East Fortieth St., New York. It contains a discussion of roof insulation and its effect in reducing fuel costs. A new complete roof unit is described.

SHOP EQUIPMENT. In a 30-page catalog No. 8, distributed by the Atlas Press Co., Kalamazoo, Mich., there are presented the line of equipment for manufacturing plants, machine shops, and home craftsmen. The catalog is well illustrated.

STAINLESS STEEL. In a folder put out by the American Rolling Mill Co., Middletown, Ohio, they set forth the advantages derived from the use of "Armco" stainless steels. Characteristics and chemical composition of two forms of Armco steels are included.

STAINLESS STEELS AND TOOLHOLDER BITS. Sterling stainless steels and Circle C and Blue Chip toolholder bits are described in two folders offered by the Firth-Sterling Steel Co., McKeesport, Pa. Physical properties and working data are presented for the various types of stainless steels. A table of standard sizes is given for Circle C and Blue Chip high-speed steel bits.

THE ROUND TABLE

Codified Skill

"When the National Recovery Act was first passed," said Al, "two years seemed too long to most shop managers. Now they're wishing it ran a while longer."

"When did you become such a Blue Eagle enthusiast?" asked Ed. "I thought you were one of those rugged individualists who want the government to stay on its own side of the fence."

"So I am," admitted Al. "I'm not wishing for the NIRA to linger on because I like it any better, but because it looks like we'll get more of it when the present law expires."

"You think it will be bigger and worse in its revised form," said Ed. "Well, maybe you're right for once. When Congress gets into full swing anything can happen. They're getting a lot of free advice already."

"Yes, the Labor Board came through with a whole flock of suggestions the other day. Instead of having one minimum wage, for instance, they'll have three or four in each industry—one for every degree of skill."

"I can see the idea in that," said Ed. "The present minimum wage protects only unskilled workers. If the principle is sound for them, then the better paid groups are entitled to similar safeguards."

"It won't work," said Al. "Skill is something you can't codify. It doesn't run in steps that can be classed A, B and C but it is different for every man. Any attempt to regiment skilled labor will tend to destroy the pride in good workmanship on which industrial progress depends."

"I don't see why," said Ed. "The whole purpose in minimum wages is to remove the pay envelope as an element price competition. That has been done for common labor. By doing the same for the skilled man you don't destroy his initiative; on the contrary you give him a feeling of security."

"Regimentation of wages usually brings all workers to a common level, Ed. It isn't so bad for unskilled labor where the element of craftsmanship is absent. But in the skilled groups only the mediocre and poor workers like it. It boosts their pay at the expense of the real artists in the trade. Industrial plants with forward looking managements are keeping a fair differential between skilled and common labor and between individuals in the higher brackets."

"But what about managers whose main idea is to cut costs?" asked Ed. "They have been compelled to pay a fair wage to the helpers and laborers, but they've done nothing for their skilled men. It's more important to save the good men from exploitation than any other group."

"That's true, but I don't believe many managers are dumb enough to chisel the wages of their best men. If they do, they're not making any savings in their costs. Besides they're laying up a lot of trouble for the future by killing the support of their most loyal employees."

Should the minimum wage principle be extended to include the more highly skilled workers? Or is it, as Al claims, impractical to codify skill?

Discussion

Trade Schools

Trade schools are of great importance to those who intend to become mechanics. To make the training a success, cooperation should exist between the men in industry and those connected with the trade schools. The shop should not look down on the trade-school boy, but should help him in every way. The trade school should not be ready to go ahead of its own accord to prepare instruction material without the help of industry, nor should it expect the boys in training to be ready to fill some skilled job in industry.

Practical training should be given in the shop along the lines started in the school. The trade school can give a boy a good start in a trade if it will ask assistance from industry in regard to the methods used and what is essential to the mechanic in industry. The school can cover the technical material and the operation of machines, which will relieve the foreman of a great deal of detail that would otherwise interfere with production.

This training, followed by a planned course of apprenticeship in the shops of industry, with the foreman giving his time to instruction when needed, will round out a program that will be of value to the apprentice, the foreman and the management. Foremen should see the viewpoint of the schools and help them by giving suggestions for the shop and the classroom.

—J. Morgan Johnson,
Apprentice Supervisor,
Tri-City Manufacturers' Association.

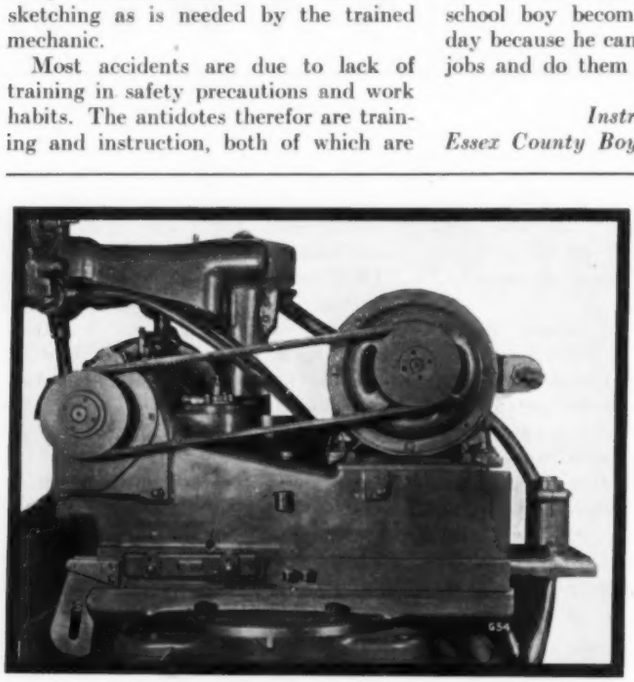
The apprentice does not get paid for having information about machines. He could hang around for years doing janitorial work and not have any more ability to do a job than he would have the first week. The boy must do a job himself, but before he can do it he must be taught the approved method. A foreman having production responsibility is not the proper person to instruct beginners, even if

he has the time. This is where the trade school shows to greatest advantage, for the object is trade training unhampered by production schedules. Here the boy is taught the fundamental manipulative skill, related mathematics and such sketching as is needed by the trained mechanic.

Most accidents are due to lack of training in safety precautions and work habits. The antidotes therefor are training and instruction, both of which are parts of the job of the trade-school instructor.

The untrained apprentice is in most cases a liability to the plant for many months because he has no knowledge or skill of the trade, whereas the trade-school boy becomes an asset the first day because he can do a great variety of jobs and do them well.

—Louis J. Lubin,
Instructor, Machine Shop,
Essex County Boys' Vocational School.



NOW!
there is
A WHEEL BASE

Not like those ordinarily found on Universal Grinders. Much heavier. Better proportioned. More efficient power delivery to the grinding wheel. Force feed wheel spindle lubrication. Wide ways, well spaced. Automatic hydraulic wheel feed.

That's the Landis Type C 14" Hydraulic Universal wheel base. It not only has these Plain production grinder features but also a swivel and slide making it fully universal.

From end to end these machines are just as sturdy and modern as the wheel base. The result is they are capable of grinding a wide variety of work within a close degree of accuracy and at a speed not associated with Universal machines. 174

LANDIS TOOL CO.
WAYNESBORO, PA.

False Security

Al is going to let himself in for trouble if he tries to dictate how his men are to spend their money. To encourage saving is good, but why insist on savings banks? Investing in a home can be done conservatively, and it may be helpful in the next depression. Some man may want to provide for the future by life insurance. How about the man trying to put his boy through college? Would Al advise or require him to play safe with savings-bank deposits and forego education for his son?

The better way is to use persuasion without even a hint of force. I have known of men allowing their employer to deduct a regular amount from each pay and to deposit it to their credit. The employer's cashier acted as the men's agent in all transactions with any bank that the men suggest, paying withdrawals at once and receiving additional deposits. This is liberal enough to escape being branded as paternalism, and yet there are a few who hesitate to build up such a savings account, thinking that the management will consider them better able to be laid off in poor times.

Business papers still foretell inflation of currency. What will happen to bank deposits then? What will be the attitude of the man toward his employer who insisted on his saving two dollars a week if his year's savings will purchase but a peck of potatoes while his neighbor is able to pay off the balance on a new car with a few weeks of inflated wages? Such conditions were found in Germany during inflation. We do not expect them here, but a man must be allowed freedom of action with no blame on anyone else if he guesses wrong.

—Harrison G. Brown,
Supervisor of Standards
Crompton & Knowles Loom Works.

Rolling Your Own

Al is right in having his fixtures made outside. First of all the standard of accuracy needed is different from that in the routine of compressor manufacture, and second, a concern specializing in making jigs and fixtures is obviously better equipped for the job. Sometimes a small pump is required in a works, but no one would suggest making it when the usual line is electric motors, though it could be done.

Industry is developing along the lines of specialization; that is each concern is making only the articles for which it is best qualified. If Al buys from the fixture concern, the fixture concern will buy from him, with consequent advantage to both. —W. Armstrong,
Leicestershire, England.

The Better Foreman

Before the advent of scientific management a foreman was an individual who could obtain the maximum amount of work from his men with but little regard to the methods used. Industry now requires that its supervisors be born leaders and have planning ability and magnetic personality. While a foreman may have these essentials, it is paramount that he have production insight, a well-grounded knowledge of human philosophy, and a planned-mind perspective, otherwise he is doomed to failure.

A good foreman is a rare jewel and but few ever attain the ideal. Nevertheless, with proper training many hidden qualities come to light that would otherwise not be discovered. To obtain efficient leaders, money must be spent on their education. They must be trained and fostered like promising race horses. Some foremen are born, while others are made of raw but productive material.

—HAROLD L. WYNN,
Executive Engineer,
Pacific Electric Manufacturing Corp.

The greatest essentials for a foreman to possess are ability to put and to keep men at work and to be able to understand the whole of the operations performed. It is not necessary for him to be a highly skilled workman at any particular job, but he must be a master of engineering practice as it affects his shop. He must be able to have an intelligent outlook on all the operations performed and to discuss the work with his men and to understand their viewpoint. A good foreman must have the confidence of the whole shop force.

Any reasonably good mechanic will have sufficient mechanical knowledge to make a good foreman, but no foreman can hope to compete with his men as regards skill at an individual job. A too highly skilled workman is likely to be a failure as a foreman. He may interfere with and expect too much from men doing work at which he is an expert. He is likely to consider all operations from his point of view as a workman and not as a foreman.

—W. E. WARNER,
Bromley, Kent, England.

In the majority of cases, Ed's opinion that a foreman should be an expert workman would be correct, but the actual necessity for this qualification seems to depend upon the type of the product. In machining repetitive work, the troubles encountered in material, its machinability, the necessary speeds and feeds are all generally solved in the first score of units, and afterward they become a routine job. After a dozen or more units have been fitted up and assembled, most of the troubles will have been met and overcome.

The foreman's chief duties are then to see that the quality and quantity of the output are maintained. Where various products are made in the same department, such as in a tool shop, then more skillful supervision is necessary. Skillfulness in a foreman should increase in proportion to the skill required in the work. Where all the employees are but moderately skilled, a skilled foreman is a necessity. On the other hand, where the skill of the men is above the average, they may do without the expert foreman, even so far as to resent his showing them how the work should be done. To safeguard his prestige and position, a foreman should be above the average skilled man in his own class of work, whether it be lawn mowers, sewing machines or airplane engines.

—W. A. HARRIS,
Coventry, England.

● *Above:* The Barnes drill, Oilgear Fluid Power Feed equipped, back of the door in the head.

DESIGNERS seeking vastly improved functioning—sales departments eager for winning features—users hunting speed and economy—will get the facts now on Oilgear's revolutionary Fluid Power Feeds.

At right, a new Oilgear Fluid Power Feed. Note: Flanged mounting, as integral machine part . . . Inside pump, eliminating hazard and bettering appearance . . . Self-contained; auxiliary valves, tubing are integral with pump. Many other exclusive features. The OILGEAR Company, 1309 W. Bruce St., Milwaukee, Wis.

OILGEAR FLUID POWER FEEDS

(B-1301)

Enduring Finish

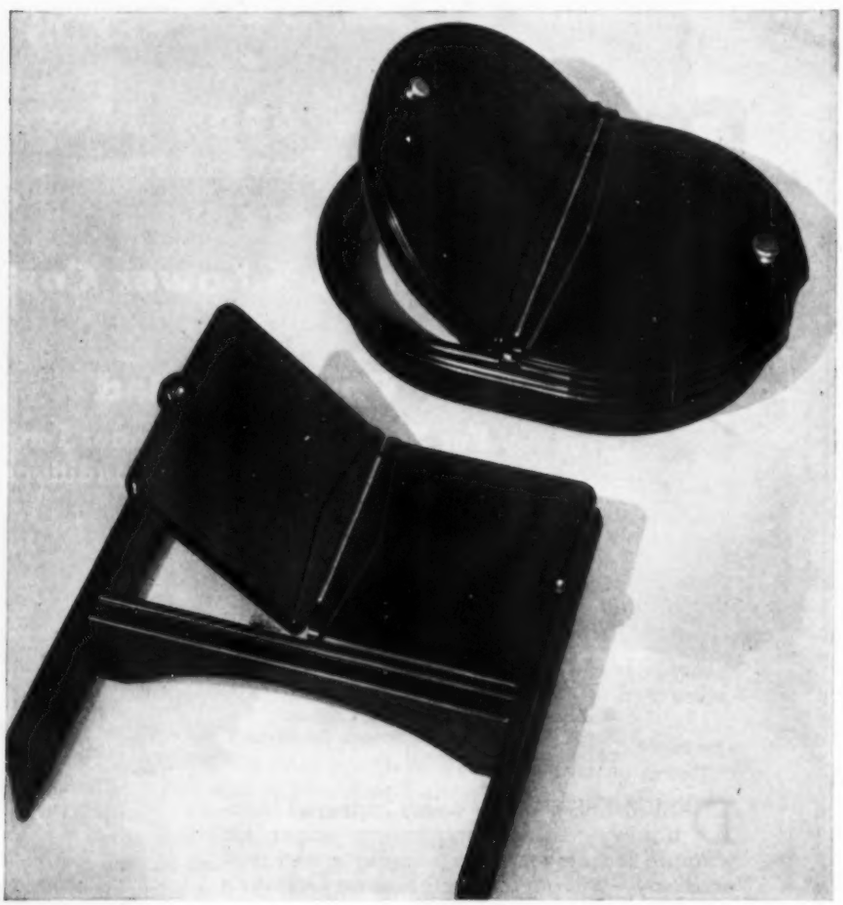
withstands hard knocks at busy fountains

AFTER ADOPTING Bakelite Molded for their new Knight Soda Fountains, The Bastian-Blessing Co. says of this material ". . . covers made from it withstand hardest knocks at busy fountains . . . . it is a superior heat insulator".

Ice cream cabinet covers, cold storage compartment covers, draft arm handles and nozzles, and syrup pump covers are subjected to frequent and often hurried handling. Through the use of Bakelite Molded these parts are given a permanently lustrous jet black finish and enduring strength that defy hard service even at the hands of the heartiest "soda jerker". Heat protection is provided by the excellent thermal insulation properties of this material.

Each part is molded accurately to close dimensions in a single closing of the molding press. In the large covers, for example, the threaded metal inserts for the metal knobs, as well as for the full-length piano hinges, are firmly embedded during the molding operation.

There are many products that could be improved and simplified through the use of Bakelite Materials. We shall be glad to have you consult us and write for illustrated Booklet 4M, "Bakelite Molded". It shows many of the latest applications of Bakelite Molded and may suggest possibilities for your use.



★

At the left are shown an oval ice cream cabinet cover and a rectangular cold storage compartment cover, two of many Bakelite Molded parts in the Knight Soda Fountain made by the Bastian-Blessing Co., Chicago, Ill. Other parts above are draft arm handle and nozzle, syrup pump cover and ladle cover.

BAKELITE CORPORATION, 247 Park Avenue, New York, N. Y. . . . . 43 East Ohio Street, Chicago, Ill.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario, Canada

BAKELITE

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the symbol "B" is the numerical sign for infinity or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

THE MATERIAL OF A THOUSAND USES